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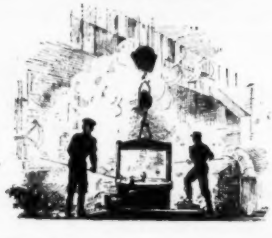

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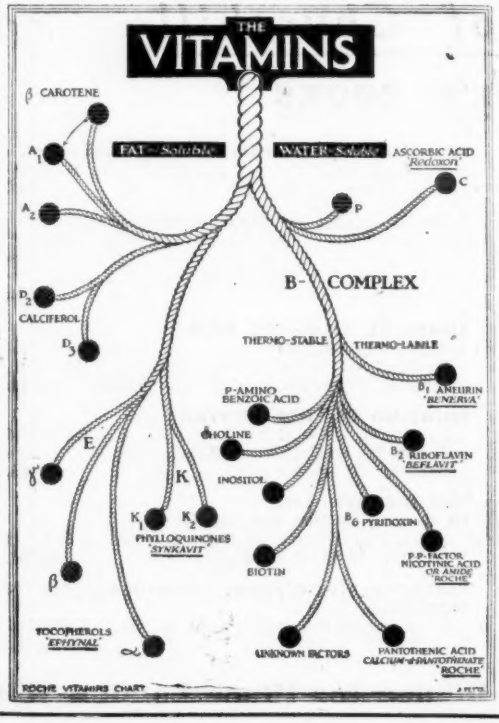


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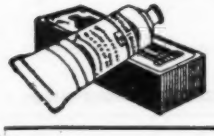

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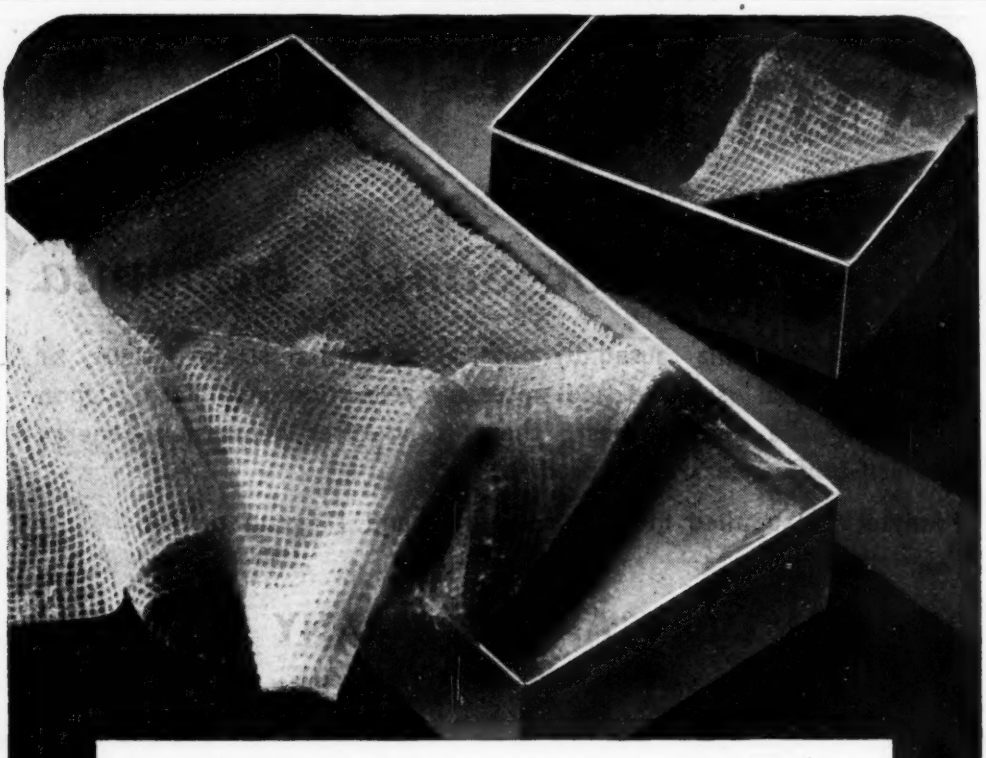

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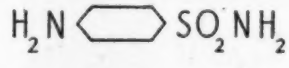

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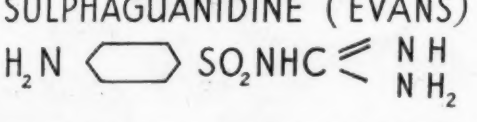

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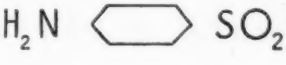

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*Monthly Bulletin of the Ministry of Health and the Emergency Public Health Laboratory Service, Vol. 2, October, 1943.

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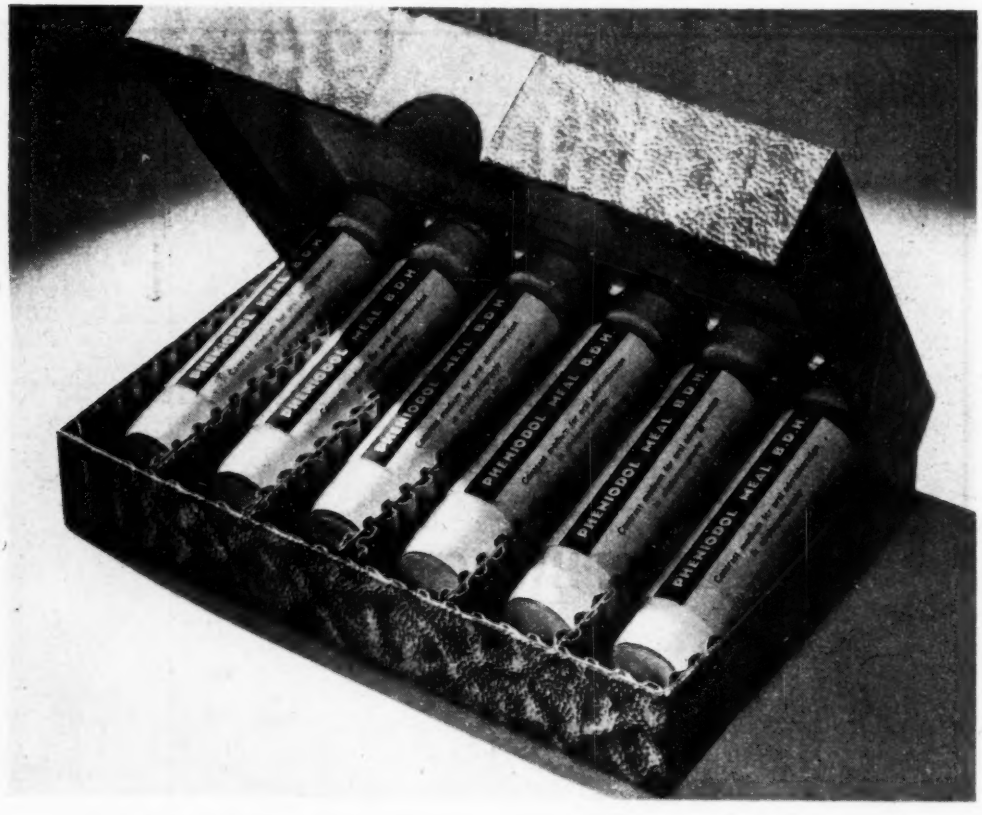


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# REFLECTIONS UPON REFORM IN MEDICAL EDUCATION*

SIR THOMAS LEWIS, CBE, M D LOND, F R C P, F R S

*Department of Clinical Research, University College Hospital Medical School*

## I. PRESENT STATE AND NEEDS

IN considering the immediate future of medicine—a term here used in its general sense—and in trying to see useful educational reforms—thought may not dwell long on the past achievements, dazzling as these have been, but must concentrate upon the present state of medicine, upon apparent weaknesses, and upon measures calculated to remedy these.

### THE STATE OF MEDICINE

A practising doctor deals with an ever-increasing number of recognisably diverse conditions of ill health. Of the forms of disease he meets, a few he will understand more or less completely, some he will understand just adequately; but most he will remain far from understanding. The idea that many diseases are fully understood is an illusion. This may readily be apprehended if on going into a general hospital ward we ask ourselves the simple question, as we pass from one bed to another, why is this person suffering thus while we are not? Only rarely can that simple question be answered. Neither can we usually explain with finality how the symptom of which this or that patient complains is brought about. Many of us are aware not infrequently in our own persons that a symptom comes, and that almost though not quite so frequently it goes again; usually its coming and its going are unexplained.

It is expedient, by such illustration, to display unmistakably our ignorance of disease and its manifestations. By so doing we become more competent to appreciate the conditions under which a student of medicine or a practising doctor now does his work; in fact he deals daily with phenomena, real or imagined, for which in very large part he has no adequate explanation. We clearly understand a phenomenon here and there; those we think we understand become our pride and bulk largely in our consciousness; those we do not understand are conveniently ignored, or, more often, we give them names and deceive ourselves that we then understand them. Beyond any doubt, our recognition of states of disease relies in very large degree upon ill-defined and often vague descriptions. Although in the absolute sense the amount of knowledge possessed is impressive, relative to what is desirable, and to what should at no very distant day be won, it is still very small.

We live in a period when ideas, nomenclature, and methods in medicine are changing perhaps more rapidly than ever before. It is also an age in which the stream of publication of new books and periodicals (many of them indifferently or badly written or edited) has risen to flood level, and in which public clamour and especially trade advertisement have surpassed their previous volumes; these importunities press ever closer around the minds of workers in medicine; modern medicine is conspicuous for a bewildering profusion and confusion of facts and ideas.

Clearly to recognise the limitations of present-day knowledge and fully to realise the contrast between medical writings and the closely reasoned argument and precise recording now found in the ancillary sciences, are matters of prime consequence in an approach to the problem of reform in medical education. First because reform, to be useful, must render the student of medicine discriminating in a world where a disquieting proportion of what is offered him in conversation and in the generality of journals and of books is inaccurate, slovenly, or redundant. And second, because reform is capable of quickly raising standards of thought and of truthful record.

We may proceed to examine the changes in medical training necessary to achieve reform under the two headings vocational and theoretical.

### VOCATIONAL TRAINING

It is universally recognised that sound education in medicine must include a training in accurate observation, cultivation of technical skill in eliciting manifestations of disease and in its treatment, a general understanding of the structure and functions of the normal body, a sound factual knowledge of disease and its processes. It is in these directions that the weight of medical education is at present thrown. Valuable as these disciplines prove, they are nevertheless far from fulfilling fundamental principles of education, or of fitting the medical student for his life work. Because far less, in fact little, attention has been given to theoretical training in the past, the need for it will be spoken of and illustrated at greater length.

### THEORETICAL TRAINING

It is fundamental in medical, as in all other forms of education, that the student should acquire sound habits of learning. He should become acquainted with the history of discovery, coming to understand how knowledge has been and is being won; he should be taught to recognise sound sources of information, past and present; he should be taught to study steadily and intelligently; that he may come to possess that great acquisition of the student—namely, a fondness, or more exceptionally a passion, for understanding, and through this achieve conscious independence of thought and judgment.

Understanding derives from an intelligent and discriminating study of past and present experiences; once attained it unbolts the doors to an understanding of further experiences. Discrimination of true from false relies upon a practised faculty of criticism, and upon a firm grasp of the rules of evidence. Understanding is the basis of progress and the vital flame in education; discrimination is the only sure defence against false doctrine and unsound practice.

When studying the ancillary sciences, and particularly physiology, a serious attempt to imbue such culture has long been made; but it is vitally important to the development of the student's mind that such culture should not cease, but that it should be continued and that it should be illustrated especially within the field in which he is to work for the rest of his life.

It may be permissible further to stress the chief gap in medical education of today—namely, academic culture, by illustration.

*Diagnosis.*—It is of high importance that students of medicine should learn more clearly than they do to distinguish between factual knowledge and conceptions. Diagnosis is a system of more or less accurate guessing, in which the end-point achieved is a name. These names applied to disease come to assume the importance of specific entities, whereas they are for the most part no more than insecure and therefore temporary conceptions. That this is so is manifest from the fact that our nomenclature of disease is a frequent source of disagreement and is constantly undergoing change. Major discoveries nearly always, and minor discoveries often, lead to immediate change of terms or of the meaning of terms. It is patent that nomenclature is insecure, definition still almost absent, and that diseases as we now isolate and name them, are in large part not disorders *sui generis*. Students of medicine should be brought to realise that these things are so. This example suffices to illustrate the high importance of an understanding of phenomena, an analysis of disturbed functions, as opposed to a purely nosographical approach. For, just in the measure that the conceptions implied in nomenclature are misinterpreted as factual, subsequent reorientation of ideas is impeded.

The fruits of studying individual manifestations of disease have far greater permanence than have the descriptions of associated symptoms under separate names. "Diseases" associate themselves with the era, with the climate or race, with special contacts with fellow men, with racial experience, or perhaps with par-

* These reflections, now slightly abridged, originally formed a memorandum of personal evidence drafted 18 months ago. I am publishing them because I have been asked to do so and because the matters discussed do not seem to me to have been sufficiently ventilated in the medical press, although the time when relevant decisions must be taken rapidly approaches.—T. L.

ticular industrial poisons. But the manifestations of disease are perpetual; their constancy is due to their being inevitable reactions of the body. Thus a student who acquires minute knowledge of a given "disease" will find this knowledge of relatively little service when this disease is no longer encountered or changes its form; but the student who fully understands a reaction of the body has knowledge which will always remain in frequent application. The first student can deal with familiar types; the second is armed against the unfamiliar and the new. And here it is to be reiterated that the student goes forth from his school to practise in a world of constantly changing ideas and nomenclature, and to meet in patients many phenomena new to him. He must be so trained that his mind readily accommodates itself to change, and to the unfamiliar. Dogmatical teaching moulds his mind to fit one groove, in which it will travel smoothly so long as the groove retains its shape; such teaching not only stereotypes, imposing a sense of completeness and finality, where knowledge is far from full or universally trustworthy, but leads to acceptation of views purely upon authoritative lines.

What has been said applies to recognition and understanding of conditions of disease, and it is here contended that, important as diagnosis undoubtedly is, and important as it is that students should obtain a wide experience in diagnosis, yet present-day medical education lays a too unbalanced emphasis upon diagnosis as an end-point. The result is the too high appraisal of memory. A measure of rivalry in diagnosis among men training for practice has much to recommend it, but under the present régime it becomes predominant and tends to exclude the more intellectual activities possible in hospital life. This therefore is a plea for the greater encouragement of the analytical, in contrast to the descriptive, method of approach, and for a wider use of inductive and deductive processes of thought.

*Treatment.*—This century has seen considerable changes in the use of remedial measures. Many very potent methods of treating or guarding against disease have been introduced, progress continues to be relatively rapid. Nevertheless there is no branch of medicine in which prejudice so readily takes command, supported by the voices of authority and of the drug vendor. A result strongly desired by both patient and doctor comes very naturally to be acclaimed prematurely. When a remedy quickly and often produces a conspicuously beneficial effect, safeguards are less needed; but where the effects of treatment are less obvious, judgment of the result is very apt to be fallacious. It should be possible to show the results of treatment by summoning groups of patients treated in the past, or to present records of such. A follow-up department could be made to contribute much to this end.

It is of high importance that every medical student should take part in chosen examples of carefully controlled treatment, where two régimes, or two remedies, are pitted against each other and the result meticulously recorded and judged without prejudice. Exceedingly few students, however, have witnessed such observations; very few are even on record.

Every student should be convinced, through both precept and example, of the fallacy of the *post ergo propter* type of argument. It is quite unreasonable that students should leave their period of training, ready to believe—as most of them come to believe—that any improvement witnessed in a patient under their care is necessarily the result of remedies given. Such men become too easily the dupes of those who trade in proprietary remedies, or of their own too quickly gathering confidence. If, after a remedy is prescribed, one patient improves and another becomes worse, there is on this evidence no more reason to ascribe the first than the second change to the remedy; but exceedingly few qualified men know this. The manner in which the practising profession are lightheartedly and constantly passing from this—first vaunted and then discarded—remedy to that, should not be regarded any longer with equanimity.

Nothing but reformed education on academic lines will correct the fantastic beliefs in many forms of present-day therapy.

### THE TWO APPROACHES IN TEACHING

Vocational and theoretical teaching are activities which, though both concerned with disease in patients, have distinct points of view, different methods of approach, and different immediate goals. It should be recognised that they are equally important, both being essential, and that they are in no sense antagonistic; they are in fact complementary. There is in each of these two main directions ample scope for a man's intelligence and energy; in fact it is very difficult today for the two activities to be carried on adequately by one and the same person, except in special or restricted spheres; that is so not only because of the great extent of each field, but also because when successfully presented they demand certain differences of outlook and of method. At the same time they should not be confined within rigid boundaries; the vocational teacher should be a man of wide culture, with in the future an increasingly scientific outlook, and it is to be hoped often engaging in research; the outlook of the theoretical teacher will lack breadth and usefulness unless there are daily experiences of practical problems. The proper relation between the two should be one encouraging very frequent contacts with a view to mutual assistance and inspiration.

*Vocational.*—Vocational teaching should maintain itself upon its present basis, concerning itself primarily with diagnosis, prognosis, and treatment. Its keynote is *concentration upon the individual*, his health, work, and conditions of living. This teaching should be done mainly at small bedside or outpatient classes, and it should be undertaken by practising doctors, whose main concern is the care of sick people. Teachers of vocational medicine should not be rigid specialists; all should possess a sound knowledge of general medicine, and assist in its teaching.

The value of the principle underlying the apprenticeship system is universally recognised; it is that upon which the success of the student appointment relies; the student learns his practice under the direct guidance of a master of practice. This work should be associated most closely with relevant work in clinical laboratory, other departments of special clinical investigation (X ray, &c.), and with post-mortem examinations.

It is imperative that a halt should be called to the steady increase of factual knowledge which students are expected to encompass, and essential that, by considered selection, there should be an actual and substantial reduction in the quantity that must be learned. When we glance through the endless pages of this and that closely printed textbook of medicine or surgery, often no longer seemingly within the capacity of one man to write, but comprising in summary form the learning of many; when we remember how difficult it has become to find unoccupied hours in the time-table of students in the first years of the final course; when we consider the natural tendency of many specialist teachers to display or even to emphasise in their teaching the particular and unusual knowledge they happen to possess in their own branches of work; then we must perforce recognise the unreasonable task set to the student of today. The present system seems chiefly intent on imposing a colossal burden on memory; it has in fact the result of largely excluding other mental processes. This reduction of factual knowledge taught, widely regarded as already necessary, becomes all the more imperative if theoretical teaching is to be given its proper place in the curriculum.

The steady aim should be to send the student forth possessed of sound knowledge of common conditions and their management, with a clear but not overcrowded mind. Vocational teaching will by no means avoid a rationalistic outlook, or simplification by generalisation, but will allow such to develop as Medicine progresses.

*Theoretical.*—The keynote of such teaching should be concentration *not on the individual but upon disease.* It should include theories of disease, both hereditary and acquired. It should clarify in students' minds what is meant by disease, and concern itself intimately with the cause of disease. It should use the history of medicine from the special standpoint of studying methods of discovery, relating step by step the manner in which important discoveries, and especially recent

discoveries, have been made; this not only for its general educational value but as a stimulus to new endeavour. It should keep close contact with work in the ancillary sciences and especially with physiology. It should explore the meaning of manifestations of disease, seeking the reason why the same manifestation occurs in different sets of circumstances, and analysing such manifestations in terms of disturbed function. Thus the teacher should be strongly backed by direct and indirect experiences of research.

In respect of diagnosis, prognosis, and treatment, this teaching should concern itself mainly with principles, with evidence and criticism on broad lines, and with selected illustration only.

This work should be a primary responsibility of the full-time professional staff, the professors and their senior assistants, who alone will have the leisure to devote themselves adequately to the relevant studies; it should be their duty to prosecute and encourage original work, and their particular task to simplify and bring order to the mass of knowledge by establishing general rules and principles. But any idea that practical teaching should refrain in its teaching from generalisations and simplifications is, let it be reiterated, to be avoided; rationalisation is essential to all forms of teaching in that it is a powerful aid to memory and to thought. The essential difference between the two types of teaching here outlined is more in the ground covered than in processes of thought.

In brief, between them the two kinds of teaching should aim at sending the student forth with a well-trained mind, familiar with and critical of sources of information, possessed of a sound knowledge and experience of all common disease, and of disease and manifestation of disease—whether common or rare—that is clearly understood. Thus a substantial foundation will be laid upon which, by building as he has been taught, his mind can become well stocked. It is altogether too burdensome to the student and to his teachers, it is also quite unnecessary, to attempt to cover the whole field of present-day knowledge of disease and its management; to attempt it defeats the purpose of sound education by overcrowding time and mind, robbing the student of all chance of contemplation and by default rendering the basis of his beliefs unsound.

### THE NEEDS SUMMARISED

From what has been said there would seem quite clearly to emerge certain outstanding needs of the present system of medical education. These are:—

1. A reduction in the amount of factual knowledge taught.
2. The encouragement of a more thoughtful and critical mental outlook; and of truer understanding of disease, its manifestations and causes.
3. A broad (but overlapping) subdivision of teaching work into two types, each complementary to the other, namely:—
   (*a*) Vocational medicine, predominantly but not exclusively taught by those engaged in its practice.
   (*b*) Theoretical medicine, predominantly but not exclusively taught by those giving full-time study to this kind of work.

It is my conviction that important reform of medical education depends upon the initial and clear recognition of these needs; that means of reform, which come subsequently to be discussed, should be considered in every instance in their relation to such few essential needs as are postulated and agreed upon.

It may be found, either by preliminary consideration or ultimately by trial, that these needs can be fulfilled in one of several ways, suited to different surrounding circumstances. It is very probable that in the initial phases some experimentation in method may be required, in which various methods are tried and their results compared, in an effort to reach the desired goal. It is much more probable that a few sound principles of action can be agreed upon, than that there will emerge a uniform and agreed arrangement of teaching. To agree upon the principles appears to be fundamental, and, if such agreement is reached, any system of education subsequently adopted should be brought ruthlessly into conformity with these principles. Thus, and thus alone, real progress can become assured.

(*To be continued*)

# INJURIES TO THE MAIN BILE-DUCTS

G. GREY TURNER, MS DURH, FRCS
PROFESSOR OF SURGERY IN THE UNIVERSITY OF LONDON AT THE BRITISH POSTGRADUATE MEDICAL SCHOOL

INJURIES to the bile-duct are unfortunately not rare, and often turn out to be tragedies. One of my friends has had to deal with over 75 cases from various parts of the country and at the moment I am concerned with 4 cases of similarly wide geographical distribution. About a third of the patients die of the immediate consequences of such an injury, and another third from the operative interference necessary for its late repair; and though the remaining third make good immediate recoveries after such interference, they are liable to recurrence of biliary disease which eventually proves fatal.

Injuries to the main ducts are nearly always the result of misadventures during operations and are therefore a serious reproach to the surgical profession. They cannot be regarded as just an ordinary risk of gall-bladder surgery, though I know only too well that even with all the care which may reasonably be expected of us accidents will occasionally happen.

Some years ago I was responsible for unintentional division of the common bile-duct on no less than 4 occasions.[1] True, there were complicating factors in all but one of these. Just before the war I was again responsible for this accident and the only comforting feature was that the division of the duct was recognised during the operation and was followed by immediate repair. That patient made an uninterrupted recovery and I believe remains well.

Much has been said about anomalies of the bile-ducts as a cause of these accidents, but I would like again to emphasise that mistakes are absurdly easy in cases where the common ducts are so lax that they may be drawn into a loop and inadvertently included in the ligature. I am sure, too, that residual inflammatory trouble of a sclerosing type may occasionally occlude the common duct after the removal of an acutely inflamed viscus. I mention this in the hope that some of my younger colleagues will keep a sharp look-out for the condition, as the cases require to be carefully investigated and described.

When reviewing the consequences of accidents during cholecystectomy we must make a distinction between the cases in which the injury is recognised when the duct is divided and is immediately repaired, and the late cases in which it is not recognised until some time after the primary operation. In the following 12 cases with which I have had to deal the 5 personal cases already mentioned are included:—

| | |
|---|---|
| *Immediate repair* (2) | |
| Died just after operation | 1 |
| Alive and well (5 years) | 1 |
| *Late repair* (10) | |
| Died just after operation | 3 |
| Alive recovering from a recent operation | 1 |
| Alive but with recurrent symptoms 8 years after operation | 1 |
| Dead from recurrent biliary diseases after 3, 5, 5½, 12 and 17 years | 5 |

This analysis shows that even long after successful operations for repair of the injury Nemesis frequently overtakes the patient and it emphasises the extreme importance of prophylaxis.

In gall-bladder work adequate exposure is essential and for my own part I prefer the Kocher incision—the oblique muscle-cutting incision just below the right costal margin. It is important to commence the removal of the gall-bladder by dealing with the cystic duct. This duct must be exposed and isolated, but no clamp or ligature should be applied to what is supposed to be the cystic duct until the common hepatic duct and the common bile-duct are clearly seen. I freely admit that there are occasions when the surgeon cannot be satisfied about this anatomical disposition, but in such circumstances the proper course is either to be content with a partial cholecystectomy, leaving a portion of the viscus just above the neck, or cholecystotomy.

1. *Proc. R. Soc. Med.* 1923, **17**, *Sect. Surg.* 18.

Next, it is imperative to examine the gall-bladder immediately after its removal and to demonstrate that only the cystic duct has been divided. I know of cases in which it was only by this examination that the accident was recognised, a portion of common duct—usually about ¼ in. long—being found attached to the removed gall-bladder. The disclosure always comes as an unwelcome surprise to the surgeon, but is of vital importance because no other course is then permissible but immediate repair of the duct.

### REPAIR

Immediately after division of the duct it is always possible to find the ends and to make a direct end-to-end anastomosis. Of course the extremities tend to retract and may be difficult to identify, but if the surgeon keeps calm they can always be found, though it may be necessary to enlarge the incision and rearrange the exposure. It may also be a help to lower the bridge or remove the wedges used to elevate the loin, for this position encourages retraction of the divided duct. Another useful procedure is to mobilise the duodenum and to draw it down much more thoroughly than would ordinarily be necessary in exposing the common duct. It may even be necessary to identify the lower cut end by opening the duodenum and passing a sound up the common duct from its orifice, though this is not as easy to accomplish in the living subject as those who have never tried it may suppose.

Having found the ends, direct repair is the proper course. For that purpose the ends must be approximated, but there should be no attempt to secure a bile-tight junction, for this often creates a stricture. Easy approximation with a few fine chromic catgut sutures and provision of drainage from the vicinity is all that is required.

I do not use a tube in the duct as a splint for suturing, nor do I introduce a tube (whether plain or T-shaped) into the lumen of the duct at the site of the anastomosis; but I always bring a tube from the neighbourhood to the surface. It is usually wise to place another tube into the depths of the hepatic pouch (Morison's pouch); this can be brought out of the original incision or through a separate posterior opening in the abdominal wall.

When late repair is needed it should not be too long delayed. Often the surgeon is confronted with a patient who has been jaundiced for 12 months or so, and is bile-logged and toxic, with the liver enlarged perhaps a hand's breadth below the costal margin. When there has been an unrecognised injury to the great ducts and jaundice supervenes, operation is inevitable and should be undertaken within two or three months of the accident; but like other operations upon jaundiced patients it demands careful preparation. If there is evidence of any severe degree of red-cell fragility the patient should have a preliminary transfusion. Sometimes a secondary anæmia also requires treatment and may be more benefited by blood-transfusion than other measures. Of the various methods employed for the repair of these injuries I believe that the best is direct implantation of the stump of the common hepatic duct into the duodenum; but it is essential to have a big opening to allow for the contraction which invariably follows.

The surgeon must recognise that he is embarking on one of the most difficult of all abdominal operations and his approach should be calm and resolute. These operations should be conducted only in the most favourable circumstances, and in surroundings to which the surgeon is accustomed and where he feels he can do his very best work.

Adequate exposure is the first essential and though the Kocher incision gives an excellent exposure for gall-bladder work, great enlargement of the liver robs it of some of its advantages, and in such circumstances one of the vertical incisions will be better. The reversed Trendelenburg position may be useful. Most operators have drawn attention to the difficulty of finding the proximal end of the duct and I have to confess to the same embarrassment. The exploratory needle thrust into the scar tissues at about the region of the hilum will turn out the best guide. Once the duct has been found it must be thoroughly opened up, for it is essential to have the anastomosis of adequate size. I doubt if it is possible to make the opening valvular, nor do I think it necessary; but in this matter as in so many others in surgery, I am not prepared to be dictatorial. The anastomosis must be supported by stitching the duodenum to the under surface of the liver, and external drainage must be provided. In the postoperative period hæmorrhage and liver failure are most to be feared.

### NEED FOR FURTHER STUDY

There is much research to be done that does not involve well-furnished laboratories, expensive equipment or technical underlings. We are still in considerable doubt about the best method of repairing the common duct, and we want someone to analyse carefully the records of all the available cases to see if we can get guidance from the end-results. Alas, I fear that such an investigation, useful as it might be, would be hampered at the outset by insufficient care and detail in the records of operations.

There is an ample field in surgery for more workers willing to record with care and accuracy the details of operations and the subsequent progress of the patients.

## HOMOLOGOUS SERUM JAUNDICE

### TRANSMISSION EXPERIMENTS WITH HUMAN VOLUNTEERS

F. O. MACCALLUM, M D, B SC TORONTO
D. J. BAUER, M B, PH D CAMB
*Wellcome Bureau of Scientific Research, London*

IN 1885 Lürman described jaundice in factory-workers in Bremen following the use of human lymph in glycerin for vaccination against smallpox. No further report of jaundice following the use of products containing human serum appeared until 1937, when this phenomenon was reported in two separate incidents. Findlay and MacCallum (1937) observed jaundice in a number of individuals several months after they had been inoculated with a yellow-fever vaccine containing human serum, and MacNalty (1938) recorded somewhat similar findings in groups of children injected with pooled measles convalescent serum.

In recent years yellow-fever vaccine has been used on a very large scale in several countries and blood and blood-products have been injected in great amounts. Possibly as a result of the increased usage, and also possibly because of the realisation that it does occur, the condition which may be termed homologous serum jaundice has been observed several times since 1937. There have been reports of jaundice following injection of (1) yellow-fever vaccine in England (Findlay and MacCallum 1937, Findlay et al. 1939), North America (*J. Amer. med. Ass.* 1942, Surgeon-General USA 1943, Oliphant et al. 1943), and South America (Soper and Smith 1938, Fox et al. 1942); (2) mumps convalescent plasma in England (McFarlan and Chesney 1944); (3) sand-fly fever vaccine in Russia (Sergiev et al. 1940); (4) transfusions with serum in England (Morgan and Williamson 1943); and (5) transfusions with whole blood in America (Beeson 1943).

The literature and the clinical aspects have been dealt with at length in these papers and in a report on homologous serum jaundice from the Ministry of Health, and will not be discussed further. This paper describes attempts to isolate an icterogenic agent from cases of serum jaundice, and from a known icterogenic serum obtained from a blood-transfusion depot.

#### Attempts at Animal Transmission

All previous attempts to isolate a causative agent or transmit the disease to experimental animals had been unsuccessful, but further experiments were carried out in 1942, when cases of jaundice following the injection of yellow-fever vaccine (YFV) and mumps convalescent plasma (MCP) appeared in this country at almost the same time. The following material was obtained through the coöperation of Brigadier General Hawley and Colonel J. E. Gordon of the USAMC:

(*a*) Blood and bile-stained duodenal juice from 2 cases of MCP jaundice in the pre-icteric stage. The specimens were collected when the patients developed a rash and were kept

at +2° C. until the diagnosis was confirmed two or three days later by the appearance of jaundice.

(*b*) Blood from 9 cases of YFV jaundice, taken on the first or second day of jaundice.

(*c*) Pieces of spleen, liver and lymph glands from two fatal cases of YFV jaundice.

These materials were inoculated into mice, rats, guineapigs, hamsters, rabbits and monkeys by intracerebral, intranasal, intracardiac, oral, subcutaneous and intraperitoneal routes, and passages of blood and various organs were made at varying intervals. In no case were any signs of disease observed.

Serum was obtained from 19 cases of MCP jaundice within the first few days of the appearance of jaundice. Further samples of plasma were collected from 9 of the 11 donors of the original icterogenic pool of convalescent mumps plasma about 3 months after the first bleeding. The serum and plasma were pooled and injected intravenously into 2 horses (obtained through the kindness of Major-General L. T. Poole). Their serum bilirubin was measured weekly for six months but no abnormality was found.

## Experiments with Human Volunteers

### TRANSMISSION FROM A CASE OF HOMOLOGOUS SERUM JAUNDICE

At the time this work was begun, all available fertile eggs were needed for other purposes, so that no attempts could be made at isolating an infective agent in chick embryos. Minced chick embryo tissue could however be obtained at regular intervals, and was used for making suspended cell cultures in serum tyrode (1 part human serum to 9 parts of tyrode).

Two strains of original cultures were started with 1 c.cm. of pooled serum or clot from each group (MCP and YFV) in 4 c.cm. serum tyrode; later cultures were started with blood of monkeys which had received the original material. The cultures were incubated at 37° C., and subcultures were carried out every 3 or 4 days by transferring 1 c.cm. of the supernatant fluid to 4 c.cm. fresh embryo tissue suspension. At each passage the surplus supernatant fluid from each strain was frozen and dried in vacuo and stored at +2° C.

As no icterogenic lots of serum had been encountered for five years, normal human serum was used for making the serum tyrode in these cultures; it was obtained from blood-transfusion depots and was heated at 56° C. for one hour and Seitz-filtered before use. Later events showed that one of these lots of serum was probably icterogenic, though definite evidence could not be obtained.

As animal experiments had all failed an attempt was made to reproduce the disease in human volunteers by the inoculation of tissue cultures. One normal man and two men recently convalescent from YFV jaundice were each given 0·1 c.cm. intradermally of supernatant fluid of the 5th passage of the MCP strain and the 9th passage of the YFV strain. Since the serum used in making the serum tyrode for these cultures may have been icterogenic these data become irrelevant apart from the fact that the volunteers received homologous serum from one source or another. The two YFV jaundice convalescents remained well.

The normal man (case 1) developed jaundice after 89 days; his history was briefly as follows:—

CASE 1.—July 3, inoculation. Sept. 10, slight anorexia; no nausea or vomiting. Sept. 17, crops of weals about 1 cm. in diameter appeared on backs of arms, then on shins, trunk and neck, at length becoming confluent. Each crop lasted for about 24 hours. Sept. 20, weals disappeared. Sept. 26, severe coryza. Sept. 28 and 29, generalised abdominal pain; urine dark. Oct. 1, sclera icteric, stools pale. Oct. 8, no symptoms apart from slight anorexia; icterus of sclera and entire body. Liver palpable one finger's breadth below costal margin; not tender. Spleen not palpable. Physical examination otherwise negative. White cells 9200; polymorphs 58%, lymphocytes 28%, mononuclears 12%, eosinophils 1%, basophils 1%. Urine contained bile. Serum bilirubin 3 mg. per 100 c.cm.

Jaundice disappeared three weeks later. The patient remained working throughout his illness, and no jaundice was seen in contacts in his establishment or in his family. He had had no known contact with cases of infective hepatitis.

Inoculations were also carried out with other tissue-culture material which was later shown to have been contaminated with the batch of icterogenic human serum (207KY, referred to later) used in making the serum tyrode. The volunteers inoculated were 1 normal, 2 recently recovered from MCP jaundice, 2 who had had infective hepatitis six months previously, and 6 convalescent from YFV jaundice. The only positive result obtained was from one of the men (case 2) who had had infective hepatitis.

CASE 2.—He was injected on Aug. 19. On Oct. 15 he first noticed stiffness and aching in the knees and left shoulder when he woke. This was followed by anorexia, an erythematous rash on arms and thighs, dark urine and icteric coloration of the skin. The liver and spleen were palpable. He remarked that his gastro-intestinal symptoms were less severe than during his attack of infective hepatitis when the liver and spleen were not palpable. He made a rapid and uneventful recovery.

Case 1 was bled on Oct. 8, the 7th day of recognised jaundice. The blood was allowed to clot overnight in the refrigerator at +2° C. and on Oct. 9 the serum was removed, placed in ampoules, frozen and dried in vacuo and stored at +2° C. Suspended cell cultures of minced chick-embryo tissue in plain tyrode were inoculated with this serum (1 c.cm. serum in 4 c.cm. tyrode). Passages were carried out as already described and the surplus supernatant fluid was dried and stored. Fertile eggs for embryo inoculation were still not available. Case 1 was bled again after 59 days and 134 days; the serum from these bleedings was stored in the liquid state at +2° C. Attempts at animal transmission with the serum of Oct. 8 were unsuccessful, including the inoculation of canaries (this had not been tried previously in this laboratory with icterogenic serum).

Further attempts at human transmission with the material from case 1 were then carried out on human volunteers. Owing to existing conditions it was impossible to isolate the subjects while they were being observed for the six months after inoculation; thus it was realised that no absolute conclusions could be drawn from the results, but it was considered that an indication might be obtained of how to attack the problem in the future. It was impossible to carry out the investigations on all volunteers in our laboratory as they were continuing at their daily work in widely scattered areas of London and its environs. However, we were able to enlist the help and coöperation of a number of pathologists without whom it would have been impossible to carry out this work. It was planned to examine the patients every 7 or 14 days for the first six weeks and then weekly for five months; it was however not always possible to adhere to this. The routine examinations consisted of white-cell and differential counts, van den Bergh reactions with measurement of total serum bilirubin, and tests for urobilin and bile in the urine. Various other examinations—such as hæmoglobin estimation, red-cell counts, sedimentation-rates, and fragility tests, &c.—were carried out at different times in some cases. Different methods of performing the tests were used in different laboratories but the more or less regular examination of each patient with the same method allowed one to follow the trend in the individual. For the first group of experiments (groups 1a, 2, 3, 4a and 4b) 23 volunteers were available. Some months later, further groups (1b and 4c) were done as subjects became available. The volunteers (V) were inoculated as follows:

SERUM

Serum taken on the 7th day of jaundice
Group 1a: V 1–5, subcutaneous injection 0·5 c.cm.
Group 1b: V 6–10, intranasal instillation 1·0 c.cm.
Serum taken 66 days after the onset of jaundice
Group 2: V 11–15, subcutaneous injection 0·5 c.cm.
Serum taken 141 days after the onset of jaundice
Group 3: V 16–20, subcutaneous injection 0·5 c.cm.

TISSUE CULTURE

2nd passage supernatant (1/125 dilution of original serum)
Group 4a: V 21–23, subcutaneous injection 0·5 c.cm.
9th passage supernatant (dilution $10^{-7}$)
Group 4b: V 24–28, subcutaneous injection 0·5 c.cm.
15th passage supernatant (dilution $10^{-11}$)
Group 4c: V 29, subcutaneous injection 1·0 c.cm.; V 30, subcutaneous injection 2·0 c.cm. and intranasal instillation 2·0 c.cm.

TABLE I—CLINICAL FINDINGS IN SUBJECTS SHOWING LIVER DAMAGE WITHIN 6 MONTHS OF INOCULATION WITH SERUM AND CULTURES FROM CASE 1

| Volunteer | Urobilin excess | Bile in urine | Rise in serum bilirubin | Symptoms | Jaundice |
|---|---|---|---|---|---|
| | Days after inoculation | | | | |
| 1 | 65–79 | 65–79 | 65–87 | 56–63 | 63–93 |
| 2 | 70–77 | 70–77 | 58–77 | 54–70 | 70–77 |
| 3 | 97–122 | .. | 97–122 | .. | .. |
| 4 | .. | .. | 107–125 | .. | .. |
| 6 | 32–39 | 39 | 24* | 36–46 | 39–42 |
| 6* | .. | .. | 80–120 | 80–130 | 80–130 |
| 7 | 94–115 | .. | 87–108 | 106–110 | .. |
| 8 | .. | .. | 55–65 | .. | .. |
| 21 | 101–108 | .. | 101–108 | 94–108 | .. |
| 24 | 81–88 | 81–88 | 79–180 | 84–180 | 88–†† |
| 25 | .. | .. | 93–119 | 108–119 | .. |

* Relapse. † Icteric weal, no jaundice.

A general outline of the scheme of inoculation is given in fig. 1. Table I gives a summary of the clinical findings in those subjects who showed evidence of liver damage within six months of inoculation. It will be seen that there is a certain uniformity in the date of onset of the rise in serum bilirubin in those cases which had symptoms without jaundice and in those with no symptoms. The serum bilirubin level at the time when symptoms or jaundice develop evidently varies from one subject to another. Symptoms may develop before there is any rise above the normal figure and jaundice may become apparent with a serum bilirubin level of 1·5–3·0 mg. per 100 c.cm.

In figs. 2, 3 and 4 the serum bilirubin curves for suggestive cases in groups 1a, 1b, 4a and 4b are given. They show a definite and sustained rise of serum bilirubin in the third month after inoculation. It is quite probable that the peak level has not been measured in a number

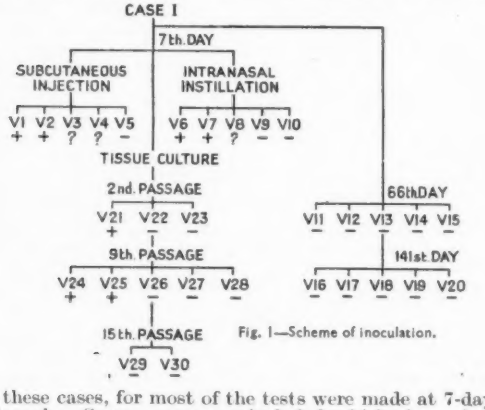


Fig. 1—Scheme of inoculation.

of these cases, for most of the tests were made at 7-day intervals. Some curves are included which show rises which are little, if anything, above what is usually considered a normal figure. However they show a general agreement in time relations with the rise in serum bilirubin seen in those cases which became clinically jaundiced; moreover these slight rises persist for several weeks and the curves eventually return to a low level. It is interesting in these small groups to note the consistency with which 2 of the 5 subjects in each of the groups 1a, 1b and 4b were affected, whereas groups 2 and 3 were completely negative. We realise of course that negative results in such small groups are of little significance.

The results obtained with these small groups suggest that an icterogenic agent was present in the serum of case 1 28 days after the onset of symptoms and at least 7 days after the onset of clinical jaundice, but not 59 days later. The agent was apparently capable of producing jaundice when inoculated by either the subcutaneous or intranasal route. It is interesting that one of the subjects (V 6) inoculated intranasally with the icterogenic serum developed symptoms on the 36th day and became mildly jaundiced on the 39th day. He recovered rapidly and 10 days later felt quite well. Against our advice he then indulged in 2 weeks of fairly strenuous exercise, the second week being spent at a physical training course. We were able to examine him at the end of each week. He had only 1·5 mg. per 100 c.cm. of bilirubin in his serum when he became jaundiced. The serum bilirubin level rose slowly after his apparent recovery and after being free of symptoms for nearly a month he suddenly developed a severe attack of the disease on the 82nd day, the serum bilirubin rising to 17 mg. per 100 c.cm.

The incubation period in the other volunteer who was inoculated intranasally (V 7) was of the same order as those found after subcutaneous inoculation. Little significance however can be attached to differences in incubation period when such small numbers are under consideration.

Although none of the 5 subjects who received material from the 9th tissue-culture passage became jaundiced, one of them (V 24) had symptoms with a serum bilirubin level of 2·4 mg. per 100 c.cm. on the 81st day, and at this time the weal produced by the intradermal injection of histamine was definitely icteric. This man had a relapse about 80 days later with symptoms and a serum bilirubin of 2·2 mg. per 100 c.cm. but no jaundice. Unfortunately no measurements of the serum bilirubin were made till just before the onset of his original symptoms, but a long follow-up after his illness showed that the serum bilirubin returned to a sustained level of 1 mg. per 100 c.cm. V 25 also had mild symptoms after a similar incubation period. V 21 received material from the second tissue-culture passage, a dilution of only 1/125 of the original serum; his case affords no proof that a living agent had multiplied in culture. On the other hand the material inoculated into V 24 and V 25 was a dilution of the original serum of approximately 1/10,000,000 and had been exposed to a temperature of 37° C. for 5 weeks.

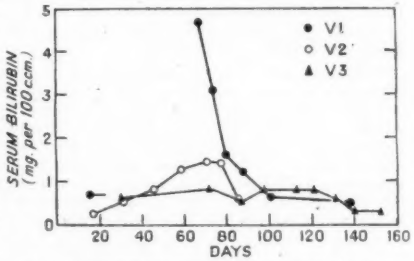


Fig. 2—Serum bilirubin curves of volunteers in group 1a.

When suggestive results were obtained in V 24 and V 25 material from the 15th passage was tested. This was inoculated into 2 volunteers (V 29 and V 30) after having been stored in the dried state for six and ten months; neither showed any signs of liver damage.

The results obtained suggest that the icterogenic agent present in the serum of case 1 was capable of multiplying in tissue culture, although more extensive experiments must be carried out before any definite conclusion can be drawn.

## TRANSMISSION EXPERIMENTS WITH ICTEROGENIC SERUM

For some years it had been our practice to obtain supplies of normal human serum for use in the production of YFV from a panel of donors, chiefly medical students, whose state of health could be easily followed. The sera were always kept for a month before use in order to see whether any of the donors were incubating an infectious disease. None of them ever developed jaundice and there had been no case of jaundice caused by the vaccine since Nov. 1937. Early in 1942, owing to conditions existing at that time, serum had to be obtained from blood-bank depots instead. It was pooled, Seitz-filtered and heated for one hour at 56° C. in a water-bath. The vaccine was prepared in such a

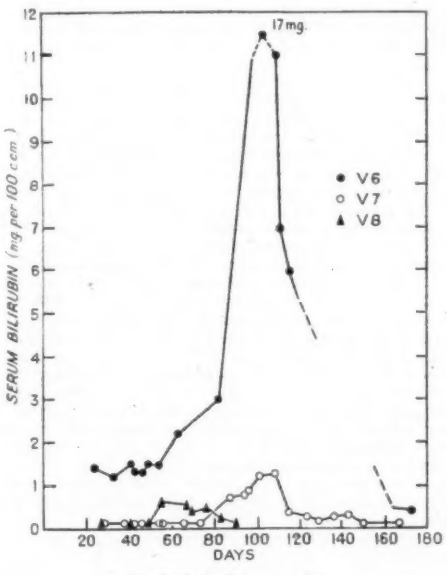


Fig. 3—As fig. 2, in group 1a.

way that the dose for one man contained 0·05–0·1 c.cm. of serum.

During a period of three months 14 different batches of serum from this source were used without any untoward occurrence, but injection of vaccine made from the 15th batch of serum caused jaundice in a large number of subjects after an incubation period varying from 56–172 days. This particular batch (no. 207KY) had been made from a pool of 65 litres obtained from three bleeding-units, and consisted of 154 bottles of 400 c.cm. each. Bottle 153 and bottle 154 had been used in making the vaccine, and it was found that most of the remaining bottles of the batch were still in store. No record was available of whether the few missing bottles had been used or, if so, with what result. Bottle 143 was obtained for study; this was the first occasion on which it had been possible to obtain a sample of suspected serum for testing the hypothesis that jaundice developing after the injection was caused by the serum contained in it.

About eight months after the original drying the contents of bottle 143 were reconstituted with sterile distilled water

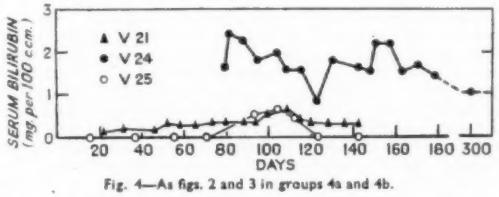


Fig. 4—As figs. 2 and 3 in groups 4a and 4b.

to the original volume, distributed in small ampoules, dried in vacuo and stored at 0° C. Suspended cell cultures of minced chick-embryo tissue in plain tyrode were made by adding 1·0 c.cm. of reconstituted serum to 4·0 c.cm. of tissue suspension. Passages and drying of the supernatant fluids were carried out in the way already described for the serum of case 1. Serum was also inoculated on to the chorio-allantoic membrane and into the allantoic and yolk sacs of fertile eggs which were then incubated at 37° C.; seven passages were made at intervals of 3–6 days with suspensions of chorio-allantoic membrane, allantoic fluid, yolk sac and embryo tissue. No abnormalities, either gross or microscopic, were observed in any tissue at any time. At each passage the remainder of the suspensions which had been used for inoculation was pooled, frozen and dried in vacuo in ampoules and stored at 0° C.

Human volunteers were subsequently inoculated with the suspected icterogenic serum 207KY, dried tissue culture supernatant of the 10th and 11th passages and dried-embryo material of the 4th, 6th and 7th passages as follows:

SERUM

V 31–36, subcutaneous injection 0·5 c.cm.
V 37–41, " " 2·0 c.cm.
V 42–46, intranasal instillation 2·0 c.cm.

TISSUE CULTURES

11th passage ($10^{-7}$ approximate dilution)
V 47–48, subcutaneous injection 0·5 c.cm.
V 49–50, intranasal instillation 0·5 c.cm.
Pool of 10th and 11th subcultures
V 51–52, subcutaneous injection 3·0 c.cm. and intranasal instillation 2·0 c.cm.

EGG PASSAGE MATERIAL

Pooled 4th–7th passage (20% suspension)
V 53–54, subcutaneous injection 1·5 c.cm.
V 55–56, intranasal instillation 1·5 c.cm.
V 57–58, subcutaneous injection 2·5 c.cm. and intranasal instillation 1·5 c.cm.

Table II gives a summary of the findings in subjects receiving the serum who showed evidence of liver damage within 6 months of inoculation. Serum bilirubin curves of positive cases are shown in figs. 5 and 6. Volunteers 31–36 and 46 were in the 20–30 age-group while V 37–45 were in the 40–60 group.

The first group of volunteers (V 31–36) were inoculated with 0·5 c.cm. of serum reconstituted after having been kept in the dried state for ten months. There was one case of severe jaundice (V 35), one case with prolonged symptoms and rise of serum bilirubin to 2·0 mg. per 100 c.cm. but no jaundice (V 33), and one with considerable rise in serum bilirubin with doubtful symptoms (V 34). V 32 was also of interest.

TABLE II—FINDINGS IN SUBJECTS RECEIVING SERUM 207KY WHO SHOWED SIGNS OF LIVER DAMAGE WITHIN 6 MONTHS OF INOCULATION

| Volunteer | Urobilin excess | Bile in urine | Rise in serum bilirubin | Symptoms | Jaundice |
|---|---|---|---|---|---|
| | Days after inoculation | | | | |
| 33 | 85–107 | .. | 79 | 69–107 | .. |
| 34 | .. | .. | 97–111 | .. | .. |
| 35 | 54–108 | 61–62 | 54–80 | 50–92 | 59–96 |
| 37 | 86–114 | 86–110 | 86–114 | 89–104 | 93–114 |
| 38 | 99–120 | 100–118 | 99–126 | 99–126 | 100–130 |
| 39 | 109–? | 125 | 120–? | 127–132 | 129–135 |
| 46 | .. | .. | 54–118 | .. | .. |

He was inoculated on the day after V 35, who had a severe attack of jaundice with onset of symptoms 50 days after inoculation. V 32 never showed any signs of liver involvement but on the 55th day complained of headache and malaise, and on examination the spleen was found to be palpable. These symptoms disappeared 4 days later and the spleen was then no longer palpable. There was no evidence of any specific infection or other condition which might have given rise to these findings.

This case suggests that a study of any group of individuals who have received icterogenic serum may reveal some cases with evidence of involvement of parts of the reticulo-endothelial system other than the liver.

The second group of volunteers received 2·0 c.cm. of the serum by subcutaneous injection. They were much older than the first group and leading a sedentary life, yet 3 of the 5 developed clinical jaundice. This result was obtained with serum which had been kept in the dried state for 14 months. V 42–45 received the same material intranasally on the same day that V 37–41 were injected. All were completely negative. The remaining volunteer (V 46) inoculated intranasally showed a slight rise in serum bilirubin without developing any symptoms.

Some of the volunteers showed a leucopenia with a fall in the absolute number of neutrophils; this however was not a constant finding and was not confined to any particular stage of the disease in those cases in which it

did occur. The other blood investigations showed no significant changes.

The incidence of jaundice in the volunteers who received the serum subcutaneously (4 cases out of 11) is very similar to that found in groups inoculated with icterogenic YFV containing the same serum. In one group of 125 Service personnel all inoculated on the same day with YFV containing serum 207KY there were 46 cases, with an interval of 73–99 days between inoculation and the appearance of jaundice. No record is available of subjects inoculated with vaccine who were ill without becoming jaundiced, or who had a symptomless rise of serum bilirubin. The groups of volunteers who were given tissue-culture and egg-passage material gave entirely negative results.

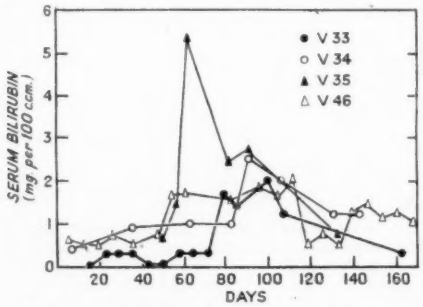


Fig. 5—Serum bilirubin curves of volunteers given serum 207KY, first group.

Complement-fixation tests were carried out with sera from the volunteers, using serum 207KY and livers from fatal cases of YFV jaundice, infective hepatitis and arsphenamine jaundice as antigens; no conclusive results were obtained. Precipitin tests using the jaundice serum of case 1, serum 207KY, and sera from cases at the onset of symptoms as antigen were all negative with convalescent sera from these cases.

Tissue cultures of serum taken on the first day of biliuria in a case of infective hepatitis were also available; 0·5 c.cm. of the 9th passage supernatant fluid, an approximate dilution of $10^{-7}$ of the original serum, was inoculated subcutaneously in 2 volunteers and intranasally in 2 others with completely negative results.

## Discussion

A summary of the results is given in table III.

Case 1 was presumably a case of homologous serum jaundice as the result of inoculation, but of course might have been one of those sporadic cases of jaundice of unknown ætiology which arise throughout the year in many communities. The results of the inoculation into volunteers of his serum taken in the first week of jaundice were similar to those following injection of the icterogenic pooled human serum, 207KY. Though small numbers of volunteers were used the results tend to confirm the finding of Oliphant et al. (1943) that blood from such cases is no longer icterogenic 2–2½ months after the onset of the jaundice. The tissue-culture and embryo inoculations are on too small a scale to make any deductions, but the results with cultures from case 1 suggest that an agent which will survive and multiply in a simple medium of minced chick-embryo and tyrode was isolated from his serum and was responsible for his jaundice.

TABLE III—RESULTS

| Material | Route | Subjects | Positive | Jaundice |
|---|---|---|---|---|
| Case 1—serum | | | | |
| 7th day of jaundice .. | S | 5 | 3 | 2 |
| 7th " " .. | N | 5 | 2 | 1 |
| 66th " " .. | S | 5 | 0 | 0 |
| 141st " " .. | S | 5 | 0 | 0 |
| Case 1—tissue culture | | | | |
| 2nd passage .. .. | S | 3 | 1 | 0 |
| 9th " .. .. | S | 5 | 2 | 0 |
| 207KY serum .. | S | 11 | 6 | 4 |
| " " .. | N | 5 | 1 | 0 |
| 207KY tissue culture .. | S | 5 | 0 | 0 |
| 207KY egg passage .. | S | 5 | 0 | 0 |

S = subcutaneous. N = intranasal.
Positive = sustained rise in serum bilirubin above normal value for the patient.

In 1939 Findlay and his colleagues suggested that the icterogenic agent in their yellow fever vaccine had been passed in tissue cultures of serum tyrode and minced chick-embryo tissue but there was no proof that this had occurred. Though the experiments with serum 207KY show that it was the cause of the jaundice produced by the icterogenic YFV, there is still no proof that the icterogenic agent present in a pool of serum from supposedly normal people is capable of multiplying in embryo-chick tissue either in vivo or in vitro.

As on previous occasions, this icterogenic agent was found to be extremely resistant. Although the serum is held at +2° C. whenever possible, it is exposed to room temperature in the process of being separated off, filtered and bottled. The lot used in making the vaccine was then heated at 56° C. in a water bath for an hour and underwent considerable handling in the process of manufacture of the vaccine. Bottle 143 used for inoculating the volunteers was reconstituted and redried after 8 months and again reconstituted 14 months after its original collection; in spite of this treatment it still had a high icterogenic activity.

The experiments with tissue culture and embryo passage of the icterogenic serum 207KY are being pursued in larger groups of subjects to investigate the significance of the negative results obtained up to the present.

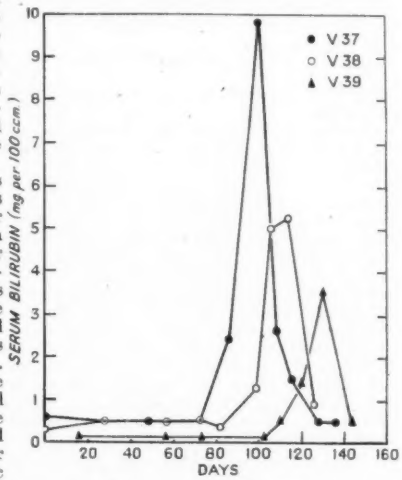


Fig. 6—As fig. 5, second group.

It is useless to theorise as to whether this condition is related or not to infective hepatitis until adequate experimental evidence is available. This cannot be realised until a susceptible experimental animal or diagnostic laboratory test can be found.

The histamine test advocated by Cullinan was performed on a number of patients at intervals from the time of their inoculation to the appearance of a rise in serum bilirubin or symptoms of jaundice. As urticaria has developed in some cases of homologous serum jaundice it was thought that there might be a change in the skin reaction to a fixed dose of histamine. In 3 patients who developed symptoms no such change was found. In 2 patients the weals produced were not icteric when the serum bilirubin was as high as 1·5 mg. per 100 c.cm. In another case (V 24) the test was positive when the serum bilirubin was 2·4 mg. but no jaundice was present.

There were no cases of jaundice among contacts of any of the cases of homologous serum jaundice, although on several occasions positive cases were associated in confined quarters with a large number of other people during their incubation period and first few days of jaundice. Four others shared a three-roomed flat with V 6 while he had a mild attack followed by a severe relapse one month later; on the evening before the appearance of the mild attack 13 other people were in the same room with him for several hours.

## Conclusion

An investigation of yellow-fever vaccine jaundice and homologous serum jaundice has been carried out with

the aid of volunteers. Although the number of subjects used in each group was small, the following tentative conclusions can be drawn:

1. Serum from a presumed case of homologous serum jaundice was icterogenic on the 7th day after the onset of jaundice but not 59 and 134 days later.

2. A batch of yellow-fever vaccine containing pooled human serum obtained from a blood-bank produced jaundice in 30–40% of those inoculated with it. Inoculation of the same serum by itself produced hepatitis and jaundice in a similar percentage of volunteers.

3. The icterogenic agent survived heating at 56° C. for one hour, and was still very active after storage for 14 months in the dried state.

4. A number of those inoculated with icterogenic sera showed evidence of liver damage of insufficient severity to produce jaundice.

5. Results obtained on 2 volunteers are not inconsistent with the view that the icterogenic agent present in the blood in homologous serum jaundice is capable of multiplying in tissue culture.

We wish to thank the volunteers without whose coöperation these results would never have been achieved, Dr. W. Allen Daley of the London County Council for his coöperation and permission to use certain LCC hospitals and laboratories, Dr. W. M. Bradley of the Ministry of Health for his help in arranging for some of the investigations, and Dr. E. N. Allott, Dr. M. Barber, Prof. S. J. Cowell, Dr. G. W. Goodhart, Dr. R. F. L. Hewlett, Dr. P. Kidd, Dr. F. A. Knott, Dr. J. F. Loutit, Dr. J. L. Pinniger, Dr. A. B. Rosher, Dr. M. Seiler and Dr. Helen Payling Wright for carrying out laboratory investigations.

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## MARFANIL AND MARFANIL PRONTALBIN

G. A. G. MITCHELL, M B ABERD
LIEUT-COLONEL RAMC

W. S. REES, M B BIRM
CAPTAIN RAMC

C. N. ROBINSON, M B GLASG
CAPTAIN RAMC

AMONG other material captured in the Desert battles were two German sulphonamide preparations not previously tested in British hospitals—'Marfanil' and 'Marfanil Prontalbin.' Marfanil ('Mesudin') is 4-amino-methyl-benzene sulphonamide, and prontalbin is one of Bayer's trade names for sulphanilamide; the marfanil prontalbin tablets are apparently composed of 50% of each. The Germans made the important claim that marfanil was effective in the presence of pus, whereas sulphanilamide, sulphathiazole, &c., are largely inactivated in its presence. Through the courtesy of Colonel J. S. K. Boyd and Lieut.-Colonel G. A. H. Buttle a supply of both preparations was placed at our disposal for clinical testing, after the latter had confirmed by in vitro tests that marfanil was in fact active in the presence of pus. Professor Fleming[1] confirmed this in a more elaborate series of experiments, and he concluded: "Marfanil is a much weaker bacteriostatic agent on the test streptococcus than sulphathiazole, but is not inhibited by *p*-aminobenzoic acid or pus. Marfanil prontalbin is to some extent inhibited and sulphathiazole is completely inhibited."

### CLINICAL TRIALS

*Marfanil prontalbin* has been tested in 26 patients. In 10 it was used as a local application only, in 9 local applications were combined with oral adminstration, and in 7 it was given only by mouth. It was therefore given orally in 16 cases, and the dosages varied between 18 and 42 grammes spread over 2–6 days. It was used in the type of case where sulphanilamide is usually given, and appeared to be equally effective, as in the following case.

A patient with a "ribbon" lymphangitis and axillary adenitis complicating a paronychia (hæmolytic streptococcal infection) was given 18 g. in 48 hours. The lymphangitis and lymphadenitis disappeared within 36 hours, his pulse-rate and temperature subsided to normal and he felt better. The finger nail was not removed.

No toxic effects were seen, and complaints of nausea and depression were uncommon, but 3 patients became very blue.

This paper, however, is concerned mainly with the local effects of these preparations, and it is not proposed to waste space in discussing marfanil prontalbin because while it gave good results those obtained with marfanil were still better, and it is likely that the beneficial effects of the mixture were due to the marfanil rather than the prontalbin.

*Marfanil* was used in 22 cases, and in all the drug was only locally applied because we wished especially to test its efficiency in purulent wounds without having the result influenced by anything given by mouth. It was applied in powder form directly to the wound, after preliminary cleansing with sterile saline. Then some non-adherent dressing such as soft paraffin gauze was applied, and this procedure was repeated every third or fourth day, but in fractures the applications were made when the plasters were changed (2–4 weeks). The amounts used at a time varied between 5 and 15 g. depending on the sizes of the wounds. The types of cases treated were as follows:

10 fleshy wounds (superficial extent 2–20 sq. in.).
3 compound fractures of tibia.
1 penetrating wound of knee (fractures femur and tibia).
1 septic amputation stump (thigh).
4 burns (petrol).
3 ulcers following cellulitis.

All were battle casualties except the last 7; the time since wounding in the former ranged between 21 and 96 days and in the latter 12 to 60 days. In all except 3 cases the general condition of the patients was good, but all the wounds were more or less purulent. Most of the patients had passed through 3–8 other medical units before their admission under our care, and previous local treatments included dressing with sulphathiazole, eusol, flavines, bipp, &c., and in a few physiotherapy in the form of ultraviolet and infrared radiations. Two of the series had been treated by us with marfanil prontalbin.

As regards the burns cases it was found that marfanil was less efficient than triple-dye-soap[2] in treating first and second degree burns, possibly because no true coagulum was formed, and the advantage of being able to leave treated areas uncovered was therefore lacking. The freedom from dressings in cases treated with triple-dye-soap undoubtedly favours healing and early restoration of function by active remedial exercises—e.g., in burns of the extremities. In deeper septic burns marfanil has advantages because it clears up infection more rapidly and so provides surfaces suitable for skin-grafting at an earlier date. This effect is now being studied in cases not included in this review as the treatment is incomplete. In 2 of the burns blisters appeared on the marfanil treated areas—the only examples of irritation seen in the whole series, and they were not serious.

Of the remaining 18 cases, in 9 there was a well-marked diminution in the amount of discharge after the institution of marfanil treatment and in 3 others an increase in the amount. All the wounds assumed a healthier appearance, and none showed epithelial destruction or exuberant granulations. Healing was almost certainly hastened in at least 12 cases, and in 6 (12–48 days old) the lesions were healed within 11–18 days of commencing treatment. One case was prepared for skin-grafting in 8 days, having been cleared of a previously resistant hæmolytic staphylococcal infection within that time.

1. Fleming, A. Special report on tests with Marfanil prepared for Medical Research Council, 1943.

2. Robinson, C. N. *Lancet*, 1943, ii, 351.

Regular bacteriological examinations were carried out, usually every fourth day (except in cases splinted in plaster), but it must be admitted that strict correlation with clinical findings was not always possible. A healing wound sometimes provided material which produced prolific organismal growths (especially *B. proteus*), so that if one had seen only laboratory reports one might have imagined the condition was static or deteriorating. Strict precautions were adopted against secondary and cross-infection, and all the loops and swabs were collected and cultured by the same skilled technician, but consecutive reports occasionally revealed a disconcerting change of flora. Such occurrences are known to all who have studied wound infections, and indicate the paramount importance of studying the actual wounds if erroneous conclusions about the efficacy or otherwise of any particular local treatment are to be avoided.

### BACTERIOLOGY

The flora of the wounds before treatment was as follows:—

| | | | |
|---|---|---|---|
| 3 | were infected | with | staphylococci only. |
| 2 | „ | „ | streptococci only. |
| 4 | „ | „ | staphylococci and streptococci. |
| 3 | „ | „ | *B. pyocyaneus* only. |
| 2 | „ | „ | *B. proteus* only. |
| 8 | „ | „ | various combinations of staphylococci, streptococci, *B. coli*, *B. proteus*, *B. pyocyaneus* and diphtheroids. |

Owing to military circumstances beyond our control some of the patients had to be transferred elsewhere while their wounds were still unhealed. It is therefore impossible to give complete bacteriological results, but sufficient information was collected to justify the following observations. As the wounds progressed towards complete healing the more highly pathogenic cocci disappeared in most cases and were replaced by such organisms as *B. proteus* and diphtheroids. In one case hæmolytic streptococci and staphylococci disappeared from infected ulcers in 4 days, and in another hæmolytic staphylococci were eliminated within 8 days. Streptococci usually proved more susceptible than staphylococci, but in one case streptococci and in another case staphylococci appeared in wounds previously free of these infections during the course of treatment. In six cases no growth was obtained on culture after 1–3 applications of marfanil, and the interesting fact emerged that this sometimes happened even when organisms such as *B. proteus* and *B. pyocyaneus* were present. Normally these organisms are resistant to most local applications, and in large series of wounds we have found they are seldom eliminated by any of the commonly used local agents, although we have some evidence that diflavine[3] (2:7-diaminoacridine monohydrochloride) and 5-aminoacridine are active against *B. pyocyaneus*.

### ILLUSTRATIVE CASES

CASE 1.—A medical officer suffering from a large (10 in. × 5 in.), very heavily infected bomb wound of the left thigh, knee and leg, with comminution of the lower femur, complete loss of the medial femoral condyle and comminution of the tibial condyles, was placed on marfanil treatment 8 weeks after wounding. Amputation had been advised and refused twice by the patient. Before and during marfanil treatment the damaged limb was supported by the combined plaster and Thomas splint method; before treatment began his temperature and pulse-rate had been consistently elevated, from 100° to 102·8° F. and 110 to 130 per min. After the first marfanil treatment, when 10 g. powder was inserted into the wound, his temperature dropped to normal within 36 hours and his pulse to 100. Five days later the wound was redressed, 15 g. marfanil being employed, and it was noted that the discharge was much less and the wound looked so much healthier that a partial secondary suture was performed. His temperature remained down for a week until he developed a metastatic abscess on the outer side of the left ankle which had to be opened. At the same time another 10 g. marfanil was inserted into the main wound, and at this time several who had seen it previously were much impressed by the local improvement. The discharge was much less, the granulations healthy, and the secondary suture had held. The improved local condition was accompanied by definite general improvement, but the destruction of bone and joint is so severe that amputation is still considered advisable, and will be carried out if the patient changes his mind. Cultures at the commencement of treatment gave streptococci and *B. proteus*. Now they give *B. proteus* only.

CASE 2.—An officer was admitted with three septic sores, each about 2 in. square, which had persisted and extended despite 7 weeks' treatment elsewhere with a variety of agents. After 4 days' marfanil treatment the ulcers were clean and healthy, whereas previously they were purulent and unhealthy. Cultures before treatment showed that all were infected with hæmolytic staphylococci and streptococci, but swabs and loops taken 4 and 8 days later gave no growth of any kind. Healing took place rapidly and was complete within 15 days when the patient was discharged to duty.

CASE 3.—An NCO with a fleshy bomb wound of the calf still had an unhealed area 16 sq. in. in extent 13 weeks after wounding, and the granulations looked indolent and unhealthy. At this time the infecting organisms were hæmolytic and non-hæmolytic, *Staph. aureus* and diphtheroids. He had been treated previously with various agents, including sulphanilamide and sulphathiazole, and an unsuccessful attempt at pinch-grafting had been made elsewhere 17 days after wounding. Marfanil powder was first used as a dressing at the 13th week and improvement was rapid. The discharge progressively diminished and hæmolytic *Staph. aureus* and diphtheroids disappeared. The non-hæmolytic *Staph. aureus* persisted, but its presence did not interfere with healing, and 17 days after the institution of marfanil treatment, when the patient had to be transferred, the raw area was smaller than a sixpence.

CASE 4.—A private was admitted 35 days after wounding with an unhealed shell wound (2 in. × $\frac{3}{4}$ in.) on the front of the ankle. He had been treated with sulphanilamide and soft paraffin dressings, and the wound looked indolent and gave a free growth of diphtheroids. After 8 days' marfanil treatment no growth could be obtained on culture, and the wound was completely healed in 14 days.

### DISCUSSION

Wound infection is the greatest single problem in war surgery, and despite the discovery of powerful new agents it still awaits full solution. It is possible, even probable, that the present tendency to concentrate on antiseptic or bacteriostatic agents applied locally, or given by mouth, intramuscularly or intravenously, will ultimately be discarded in favour of methods designed to increase the local and general natural anti-infective and repair mechanisms. Obviously this would be the most rational procedure, only we are handicapped by inadequate and sometimes contradictory knowledge of these vital processes.

Since penicillin will not be available in really large amounts for some time, many of the wounded in this war will have to be treated by other less efficient substances. Among these marfanil, or some similar compound, deserves a place for the following reasons. Clinical use has confirmed in vitro tests showing it is active in the presence of pus, and has also shown that it will sometimes inhibit the growth in wounds of gram-negative organisms which have proved resistant to other local applications. It is almost unirritating, apparently no more toxic than sulphanilamide, and does not destroy epithelium or prevent its growth, while its success in controlling infection hastens healing. No other substances known to us, except penicillin and certain compounds containing penicillin not yet described, have been so uniformly successful in controlling or eliminating wound infection. The figures given bear this out and show that in 50% of the patients treated there was very definite local improvement, while altogether about 70% showed some improvement when marfanil treatment was instituted. Those who have had experience in treating large numbers of infected wounds will realise how favourable are these results. One indicator of the efficacy of marfanil was the fact that in a third of the cases no growth could be obtained on cultures after 4–12 days' treatment, and these results were obtained in purulent wounds not normally influenced by local chemotherapy. Not only was healing hastened but more important still the patients were spared the evil effects produced by chronic sepsis and toxæmia on vital organs.

At present marfanil is only available in very limited amounts, and it has been impossible so far to test it in

3. Mitchell, G. A. G. and Buttle, G. A. H. *Ibid*, p. 287.

solution for irrigating wounds. The fact that it is readily soluble in water enhances its potentialities in this respect, but also limits its period of local activity. This latter disadvantage may be overcome if it is found possible to add, for example, a succinyl group to the molecule. This was done in the case of sulphathiazole, and the resulting succinyl sulphathiazole has been successfully used for the treatment of septic wounds.

CONCLUSIONS

Of the many substances we have tested in the treatment of infected wounds penicillin alone has given better results than marfanil. At present for technical reasons it may prove easier to produce marfanil in much larger amounts than penicillin, and thus, even although the former is less effective, further investigation of marfanil is indicated. It is possible also that penicillin used in conjunction with marfanil may give better results than when it is mixed with sulphanilamide or sulphathiazole.

We desire to thank Colonel L. A. J. Graham for permission to publish this report; Colonel J. S. K. Boyd and Lieut.-Colonels G. A. H. Buttle and R. J. V. Pulvertaft for help and advice, and for providing the materials used in this investigation; Major R. D. Mackenzie and Sgt. Wilson for laboratory investigations; and the theatre and ward staffs of 42 General Hospital for their coöperation.

## TWO CASES OF LEPROSY IN LONDON

HENRY HABER, M D PRAGUE
MEDICAL OFFICER AT THE LONDON LOCK HOSPITAL

Two cases of leprosy have recently been diagnosed at our hospital within a short time.

CASE-RECORDS

CASE 1.—A Cypriot, aged 27, who came to England in 1935, said that nodules appeared on his forehead in 1939 but then there were no other signs or symptoms. In 1940 he had three months' treatment for syphilis and in October, 1941, he was transferred to us from St. John's Hospital for Diseases of the Skin with a positive Wassermann reaction (WR) and an extensive serpiginous syphilide on chest and back. Small nodules were also present in congested areas on the face, and these at first were diagnosed as acne rosacea. The patient was given four complete courses of neoarsaphenamine and bismuth but though the syphilitic rash disappeared after the first course, the WR remained strongly positive. The cerebrospinal fluid showed no abnormality.

When during treatment further nodules appeared on the face and erythema on the chest, leprosy was suspected and this diagnosis was confirmed when a nasal smear for Hansen's bacilli was found positive. There are grouped nodules, reddish in hue, shiny and firm to the touch, distributed over the supraorbital region, the nose, ears, cheeks, lips and chin. Otherwise the skin of the face is normal, but in hot weather, or when heated by a fire, it is apt to flush. Though there is alopecia of the outer eyebrows and eyelashes, the scalp is free from any manifestations. On the chest there is a vivid erythema, map-like and irregular. The extensor surface of both forearms shows brown follicularly arranged nodules, some solitary, others coalescing to form larger lesions. The inguinal and vertical femoral glands are much enlarged, and both ulnar nerves behind the olecranon process are thickened. The patient first noticed bleeding from the nose in 1940, but has had no attacks since then; no areas of anæsthesia have been detected on the body. Dr. J. E. M. Wigley confirmed the diagnosis of leprosy and demonstrated the case to the dermatological section of the Royal Society of Medicine (Nov. 18, 1943).

A nodule excised from the forearm was fixed in formalin and stained with hæmatoxylin and eosin. The epidermis was atrophic with its papillary-peg formation partly obliterated, and there was perifollicular and periglandular acellular infiltration in the upper and lower parts of the corium, the arrangement being of the sarcoid type; the nodules were separated by what seemed to be normal connective tissue. The cellular infiltration consisted of epithelioid and connective-tissue cells. There was an abundance of clear cells, the so-called lepra cells of Virchow. Sections stained by Ziehl-Neelsen revealed many acid-fast bacilli of Hansen.

CASE 2.—A 33-year-old Cypriot, who came to England in 1939, had suffered from syphilis 12 years before. In 1940 a slightly itching rash appeared on the hands and feet, and in 1941 similar lesions developed on the chest and trunk, and later on the face. Six months later areas of anæsthesia were discovered on the hands and ankles, and on the left temple. Bleeding of the nose began two years after the first symptoms, and after another year weakness of the hands compelled the patient to give up work. A sloughing ulcer developed on the left leg.

Now, three years after the first symptoms, the whole face is reddened and desquamates slightly. The forehead, nose and cheeks (the ears are only slightly involved) show large numbers of red-brown nodules with a scaly surface; the general appearance of the face is very much like that of rosacea. There is almost total alopecia of the eyebrows and eyelashes. The abdomen is covered with a big patch of macular rash, light brown in colour and desquamating slightly. This rash also occurs on the lower part of the chest, but here there are sharply defined discoid and elliptical lesions. Except for a small gap between the shoulder-blades the rash completely covers the back. The glands of the groin are enlarged. There are large numbers of nodules, irregular in shape, on the forearms, and the hands themselves are acrocyanotic, with atrophy of the skin; both ulnar nerves show thickening; on the left leg there is a large irregular sloughing ulcer surrounded by small ones, the adjacent skin being chronically inflamed as in varicose ulceration; the feet are cyanotic; the nails show slight dystrophy. Anæsthesia has developed in the following places: both temples, forehead, dorsum of both hands, extensor surface of the forearms, ankles, both legs (in patches) and one of the macules of the chest. The WR was negative. A nasal smear stained with Ziehl-Neelsen showed Hansen's bacilli.

Two pieces of tissue were excised—one nodule of the forearm and a part of the macular lesion. These were fixed in formalin and stained with hæmatoxylin and eosin. Both showed an atrophic epidermis with its pegs flattened from compression of the underlying granuloma, consisting of the same elements as in case 1; and both sections showed Hansen's bacilli, though these were less numerous in the macular lesion.

Case 1 presents a typical nodular leprosy, while case 2 is of mixed type.

Pardo-Castello and Tiant (1943) state that the histamine test is of great value in the diagnosis of anæsthetic lesions due to leprous neuritis; a normal reaction excludes leprosy.

The test consists in intradermal injection of 1 in 1000 solution of histamine phosphate, the reaction being an immediate purpuric spot at the site of the injection followed by an erythematous areola and finally by a central weal (Lewis 1927). This triple reaction of Lewis seems to be due to direct neurovascular stimulation by histamine and probably to its liberation by way of the axon reflex, this reaction depending on the integrity of the sensory fibres of the peripheral nerves. When a peripheral nerve degenerates, the triple reaction does not occur and only the central weal develops; but in diseases of the spinal cord the axon reflex remains unaffected for an indefinite time and the histamine test is normal. The test is therefore useful in the diagnosis of leprosy.

In both our cases histamine tests gave positive reactions. In case 1 (the nodular type) the reaction was obtained when no anæsthetic symptoms had developed, though this is perhaps not surprising considering the already manifest involvement of the ulnar nerves. Probably neuritis was in progress before anæsthetic symptoms developed, and this case too may be regarded as of mixed type.

CONCLUSIONS

Both patients had syphilis in their history. The WR was negative in case 2. In case 1 it remained strongly positive despite several arsenical courses, though it was negative in the cerebrospinal fluid and there was no clinical evidence of neurosyphilis. The question whether the continuance of a positive WR in this patient was due to seroresistant syphilis or not is difficult to decide. Cumming et al. (1935) state that 50–70% of a certain type of nodular leprosy show a false positive WR.

Both patients had Hansen's bacilli in their nasal secretions. They live in humble circumstances in an overcrowded district, and the risks of their spreading the disease are appalling in their implications. As in this country leprosy is not yet a notifiable disease they cannot legally be isolated. Revision of the law on this point appears to be overdue.

The fact that both patients came from Cyprus has led me to test the nasal smears of all Cypriots attending our clinics. No other case of leprosy has yet been discovered, but I am continuing with this precaution.

I am indebted to Mr. J. Johnston Abraham for permission to record the cases.

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## NOMENCLATURE OF MALNUTRITION

LUCIUS NICHOLLS, M D CAMB
DIRECTOR OF THE BACTERIOLOGICAL AND PASTEUR INSTITUTES, CEYLON

THERE is usually only one causal organism in each infectious disease, and hence such diseases as typhoid, tuberculosis and malaria are easily recognised as entities. But for diseases due to dietary deficiencies the matter is far more complicated, because (1) poor diets are always deficient in more respects than one, and (2) individual reactions to deficiencies are very variable.

The state of affairs in two groups of malnourished persons will exemplify this.

### DEFICIENCY AMONG PRISONERS

In a prison of more than 1000 inmates 55% had phrynoderma, about 30% complained of night-blindness, and there were 17 cases of keratomalacia. Sore mouth occurred in 18% and scrotal dermatitis in 16%, but only 44% with scrotal dermatitis also had sore mouth. A high percentage of the prisoners complained of symptoms indicating neuritis, and some showed definite signs. A physician who examined them made tentative diagnoses of neuritis, poliomyelitis, ataxia and beriberi, which shows how variable the signs were.

In the prison some inmates had no definite signs of deficiency; others had signs of deficiency of one vitamin only, though not the same one in all cases; while others again had signs of more than one deficiency. Yet all partook of the same curry and rice diet and the cooking and serving of the diet precluded preferential treatment, except for the few working in the kitchens. The length of time they had been in the gaol showed that the incidence of the signs increased after the first month's imprisonment; but there was no indication of why the signs varied. It is reasonable to conclude that all the prisoners were in a state of multiple vitamin deficiency.

### DEFICIENCY IN CHILDREN

Under war conditions in Ceylon wages have gone up, the cost of living has increased and rationing has been introduced. Many persons have prospered, others have not, and among the latter are a number of indigents who are definitely poorer, and whose children show malnutrition.

Excluding all patients with infections such as pneumonia (whether they were malnourished or not), 30 consecutive cases of malnutrition were studied in the Colombo children's hospital. The following are the salient signs in 10 of these:

1.—Boy aged 2. Emaciated, œdema of legs, pigmented conjunctivæ, Bitot's spots, xerophthalmia.

2.—Boy aged 1½. Apathetic, emaciated, angular stomatitis.

3.—Girl aged 2½. Apathetic, emaciated, xerophthalmia, diarrhœa, scabies.

4.—Girl aged 2. Very emaciated, spongy gums (bleeding), early keratomalacia.

5.—Boy aged 2. Slight œdema, diarrhœa.

6.—Boy aged 1. Œdema, angular stomatitis, glossitis, xerophthalmia, dermatitis of crazy-pavement type.

7.—Girl aged 2½. Emaciation, apathy, corneal opacities from keratomalacia.

8.—Boy aged 3. Phrynoderma, slight œdema, blind from keratomalacia.

9.—Girl aged 2 7/12. Emaciated, diarrhœa.

10.—Boy aged 2 4/12. Emaciated, dying with terminal diarrhœa.

An analysis of the signs of malnutrition found in these 30 children is as follows:

| *Skin* | | *Eyes* | |
|---|---|---|---|
| Phrynoderma | 1 | Xerophthalmia | 7 |
| Dry skin with mosaic over tibiæ | 4 | Pigmented conjunctivæ | 6 |
| Crazy pavement | 1 | Bitot's spots | 2 |
| Œdema | 6 | Corneal opacities | 2 |
| | | Keratomalacia | 2 |
| *Mouth* | | *General symptoms* | |
| Angular stomatitis | 10 | Apathy | 8 |
| Eroded tongue | 3 | Irritability | 4 |
| Spongy gums | 2 | Diarrhœa | 5 |

Many of the children had anæmia but there were no advanced cases among them. Symptoms are difficult to determine in children, but several had photophobia, sometimes apparently accompanied by lacrimation. Neuritis probably occurred in mild form, for examination of the spinal cords and nerves of children dying of types of malnutrition similar to those considered here has shown myelin degeneration of nerves and cord which may be described as subacute.[1]

It is strange that only one child had phrynoderma, because this eruption, which declined in prevalence during the first two years of the war, has again become prevalent among the children at free schools.

The most noteworthy change in the diets of the labouring classes since Japan entered the war has been a great shortage of rice and its replacement by white flour of about 72% extraction, and to a smaller extent by whole wheat. Thus the children of the more indigent are receiving overmilled cereals, eked out with manioc, and very little else. The rices previously in use were parboiled and these have higher nutritional values than overmilled white flour.

### NOMENCLATURE

Many names have been given to more or less indefinite types of malnutrition, especially those seen in children. Barlow's disease was the first, and later examples are pseudo-pellagra, infantile pellagra, mandama, kwashiorkor, culebrilla, Gillan's œdema, pellagroid beriberi. It is doubtful, however, whether such names are an aid to accurate comprehension, or whether types of malnutrition can be rigidly categorised.

A great disadvantage of the absence of a satisfactory nomenclature is that vital statistics are silent on many deaths of nutritional origin, and these are attributed to some terminal condition such as bronchopneumonia, dysentery or skin sepsis.

To be valuable terminology must be elastic; and perhaps the use of letters in naming vitamins should be continued for this purpose. Thus in cases where the signs indicate a deficiency of vitamins A and C, or vitamins D and $B_2$, they would be referred to as AC deficiency and $DB_2$ deficiency.

## PHARMACOLOGY OF THIOUREA

DAVID CAMPBELL M C, M D GLASG
PROFESSOR OF MATERIA MEDICA, UNIVERSITY OF ABERDEEN

F. W. LANDGREBE D SC ABERD
BEIT MEMORIAL FELLOW

T. N. MORGAN, M D ABERD
UNIVERSITY LECTURER IN MATERIA MEDICA

Astwood's recent demonstration of the effect of thiourea in relieving many of the symptoms of thyrotoxicosis is likely to lead to the wide therapeutic employment of this and allied substances. There is still great uncertainty as to their fate in the human body and their mode of action. An investigation of the pharmacology of thiourea was therefore undertaken.

Werner's (1912) observations on the chemical reactions of thiourea were repeated and confirmed. They suggested (1) a technique for estimating the excretion of thiourea in the urine, and (2) the possible mode of action of drugs of this nature.

### ESTIMATION OF THIOUREA IN URINE

Storch (1890) showed that when nitrous acid or other oxidising agent is added to an acid solution of thiourea, the feeble base H.$_2$N(NH$_2$).S.S.(NH$_2$).C:NH, later named formamidine disulphide (Fichter and Wenk 1912), is

1. Nicholls, L. *Indian med. Gaz.* 1935, **70**, 550.

produced. Werner pointed out that this base is formed only when a strong acid ioniser is present, that indeed when nitrous acid and thiourea interact in aqueous solution in the presence of a weak acid, thiocyanic acid is directly produced according to the equation:

$$CSN_2H_4 + HNO_2 = HSCN + N_2 + 2H_2O.$$

The change thus takes place between equal molecular proportions of the two compounds. He showed also that though formamidine disulphide is formed when nitrous acid and thiourea interact in aqueous solution in the presence of a strong acid, this substance is further decomposed with formation of thiocyanic acid. In this case, two molecular proportions of nitrous acid to one of thiourea are required to complete the change. He further pointed out that the yield of thiocyanic acid is somewhat less than the theoretical (about 85%) because in the reaction a portion is oxidised to hydrogen cyanide.

On the basis of these observations, we have developed a test for thiourea in urine, which depends upon the production of the characteristic red coloration due to ferric thiocyanate when the urine is treated with an acid, sodium nitrite, and ferric chloride. Hydrochloric acid was found to be the most suitable acid, giving the maximum consistent yield of ferric thiocyanate under the quantitative conditions specified below.

*Performance of the test.*—A fresh specimen of urine is diluted four times with water. 10 ml. is pipetted into a 100 ml. conical flask. 0·5 ml. of concentrated hydrochloric acid is added followed by 1·0 ml. of 20% sodium nitrite. An immediate transient brownish colour is produced, followed by the evolution of nitrogen peroxide and nitrogen. The reaction is allowed to continue for 30 minutes, by which time the effervescence has largely subsided. 1·0 ml. of 15% ferric perchloride is then added and the resulting red colour of ferric thiocyanate is measured in a colorimeter using a green filter. In the present investigation, estimations were made with a Hilger-Spekker photometer using a filter transmitting light between 4900 and 5950 A. A visual colorimeter also gives good results. Standard solutions containing 5, 10, 20 and 30 mg. of thiourea per 100 c.cm. are used for constructing a calibration curve.

There are several reasons for diluting the urine. With some undiluted urines a yellow tint may develop which interferes with the colorimetric estimation. Another and more important reason is that certain normal constituents of urine (urea in concentrations over 2·5 mg. per 100 c.cm. creatinine, and phosphates) interfere markedly with the reaction. The importance of dilution is illustrated in the table.

THE FIGURES GIVEN IN THE TABLE ARE OPTICAL DENSITIES AS MEASURED ON THE HILGER PHOTOMETER WITH GREEN FILTER

| Concentration of thiourea mg. per 100 c.cm. | Solvent | | |
|---|---|---|---|
| | Water | Undiluted urine | Diluted urine |
| 50 | 1·6 | 1·45 | 1·65 |
| 25 | 1·05 | 0·9 | 1·1 |
| 10 | 0·72 | 0·7 | 0·7 |

As already mentioned, the recovery of thiocyanate from a standard solution of thiourea in water or in dilute urine is less than the theoretical, presumably because of further oxidation of a small amount of thiocyanic acid by nitrous acid. Nevertheless, with a standardised technique, comparable results can be obtained.

## OBSERVATIONS OF EXCRETION IN MAN

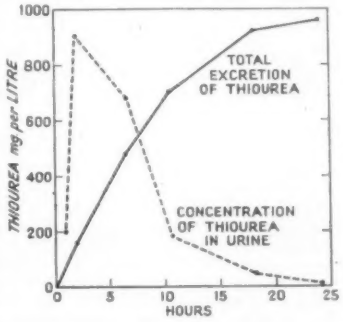
Several experiments on the excretion of thiourea have been carried out, of which the following is a typical example.

One gramme of thiourea was administered to a fasting patient, in bed under ordinary hospital conditions. The urine was collected at intervals and the thiourea content estimated by the above technique. As will be seen from the chart, excretion is rapid, thiourea appearing in the urine within one hour. By ten hours 75% of the dose had been excreted, and by twenty-four hours 96%.

It is clear from these and other observations that thiourea is rapidly absorbed from the intestine and quickly excreted unchanged in the urine. Attempts to estimate exactly the amount in the blood by the employment of the method described above, after precipitation of the proteins by various reagents, have so far failed. But by precipitation with alcohol and subsequent evaporation of the filtrate, it can be detected in serum when the concentration is over 5 mg. per 100 c.cm. Blood and serum taken from patients at various intervals after oral administration of as much as 2 g. thiourea have been never found to contain the drug by this test. It can easily be shown that thiourea is very diffusible and dialyses rapidly through pyroxylin from a solution in serum. It may safely be concluded therefore that after absorption it is quickly and widely distributed in the tissue fluids, and that, like many other drugs, it is excreted rapidly in the urine.

## MODE OF ACTION OF THIOUREA

It has been made clear by the researches of Astwood and his collaborators that thiourea does not act by neutralising the action of thyroxine in the body tissues, but that in some way or other it interferes with the synthesis of the thyroid hormone. They reject the idea that iodine deficiency is responsible for this. They noted, it is true, that the thyroid hyperplasia caused in rats by adding thiourea to the drinking-water is slightly inhibited by adding potassium iodide at the same time, but they doubted whether the large doses of iodide used in their experiments exerted any specific effect on the thyroid. They found, for example, that 0·1% potassium iodide added to drinking-water containing 1% thiourea did not affect the thyroid response to the drug. They concluded that "iodine deficiency is a highly unlikely factor in the genesis of this form of goitre."




It is doubtful if such a conclusion is justified. It is fairly obvious that the histological changes seen in the rat's thyroid under the influence of thiourea are essentially the same as those produced by restricting the iodine supply. The difficulty in accepting a similar explanation for the action of thiourea appears to lie in the fact that several thousand times the minimal daily requirement of iodine (administered as iodide) has no inhibitory effect on the thyroid enlargement. The difficulty is perhaps not a real one, for two reasons.

(1) The bulk of iodide ingested is excreted quite rapidly in the urine. Only a portion of it is fixed by the thyroid gland, and the active compound is not formed for many hours. It is clear from Harington's work that tyrosine is the parent amino-acid from which thyroxine is ultimately derived. So long as iodine is present in the body as iodide it cannot interact with tyrosine to form diiodotyrosine, which is both the precursor of the active principle and a constituent of the storage protein. The iodide in the gland must be oxidised, presumably by enzyme action, to form iodine, which is then available for combination with tyrosine.

(2) Thiourea has a peculiar chemical affinity for iodine. If, for example, the drug in powder form is added to a solution of iodine in hexane, the violet colour is immediately discharged. Interaction in water takes place just as readily with the formation of the hydriodide of formamidine disulphide according to the equation:

$$2CSN_2H_4 + I_2 \rightleftharpoons C_2S_2N_4H_6 . 2HI.$$

The reaction is reversible in concentrations of thiourea above 0·04% (Werner), but, even in the presence of alkali iodide, is stable at all concentrations below 0·02%, a much higher concentration than, as we have seen, can be obtained in the tissues. The above equation shows that 1 mg. of thiourea will combine with 1·63 mg. of iodine.

It seems reasonable, therefore, to assume that the continuous presence of thiourea in the thyroid gland will at once bind any iodine liberated for the building up of

diiodotyrosine and thus interfere with the synthesis of the thyroid hormone.

SUMMARY

(1) A method for the estimation of thiourea in urine is described.

(2) After oral administration, thiourea is widely distributed through the tissue fluids and is rapidly excreted unchanged in the urine.

(3) It is suggested that the mode of action of thiourea may lie in its peculiar power to combine with iodine and form formamidine disulphide hydriodide, thus preventing the synthesis of diiodotyrosine and so of thyroxine.

Our thanks are due to Organon Ltd., for a supply of thiourea.

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## Reviews of Books

### Sane Psychology

R. J. S. McDOWALL, MD, D SC EDIN., professor of physiology in the University of London at King's College. (Murray. Pp. 275. 9*s*.)

IT is generally conceded that the doctor needs to know about human nature, and it follows that the medical student cannot much longer be expected to draw in this knowledge with the air he breathes. Some teaching of psychology there must be, and the difficulty is to decide who shall give it and when. If it could be allied with physiology, not only temporally but in spirit and substance, this would be a gain, as long as there was no attempt at premature fusion or surrender of independent territory. Professor McDowall shows, in this "biological introduction to psychology," that the subject can be presented so that it would be complementary to physiology, and that the teaching of both might even be carried out by the same man. It is possible to point to passages in the book which betray the amateur and to believe that psychology is best taught by experts in psychology, while recognising that this is a better introduction for the medical student than many a book of impeccable authority. Its chief defect lies in the mode of exposition. The reader is persuaded to draw specific conclusions from familiar facts of which he is gently reminded: he is not told of experiments and instructed about methods and evidence. What has been called dynamic psychology or psychobiology occupies perhaps too much of the stage; the future doctor will need to learn also about the many developments of modern psychology which are here barely alluded to. But a sensible easily read book about some aspects of psychology is always welcome, and when written by a professor of physiology is a sign and a portent.

### Introduction to Medical Mycology

(2nd ed.) GEORGE M. LEWIS, MD; MARY E. HOPPER, MS. (Year Book Publishers; H. K. Lewis. Pp. 342. 41*s*.)

THIS work is divided into two main sections—clinical and laboratory—and the greater part is of dermatological interest; but the sections on mycotic infections of deeper structures should appeal to the general physician. The writers have handled much clinical and laboratory material, and therefore write with authority. Their observations on the trichophytin test help to clear up many issues. They lay down some criteria on the subject of dermatophytids: that the primary focus must contain pathogenic fungi; that the trichophytin test must be positive; that fungi must not be present in the secondary rash; and that the rash must disappear spontaneously on eradication of the primary focus. Strict application of these standards would do away with much current loose diagnosis, especially where the dysidrotic type of lesions of the hands is concerned. A plea is made for an accurate determination by culture of the fungus present in cases of ringworm between the toes, especially as the prognosis is so different in the two main types of cases. Those caused by *Trichophyton gypseum* yield readily to treatment, while those caused by *T. purpureum* are extremely resistant. The much publicised camphor and carbolic treatment of foot ringworm is condemned as highly dangerous. In the laboratory section full details are given of all procedures and the whole work is crammed with fascinating and valuable information. It is besides easy to read and beautifully illustrated.

### Vascular Abnormalities and Tumours of the Spinal Cord and its Membranes

R. WYBURN-MASON, MD CAMB., MRCP, registrar at the National Hospital, Queen Square, London. (Kimpton. Pp. 196. 18*s*.)

THE field covered by this monograph is not as wide as the title suggests. It deals with those rare vascular abnormalities and vascular tumours which puzzle the neurologist and neurosurgeon. The first half contains a review of published work, which is related to clinical material described in a series of case-histories in the second half. These cases are collected from the archives of many hospitals and fully illustrate the field covered. Most of the sections are brief and contain accepted views, but those dealing with the vascular abnormalities in the cord associated with congenital heart disease and with Lindau's disease are particularly interesting, especially where the problem of the ætiology of syringomyelic degeneration associated with hæmangioblastomas is discussed. It is a pity that the author lays so much emphasis upon the use of iodised oil in the diagnosis of conditions which are not benefited by surgical treatment, since most surgeons are loth to leave iodised oil in the theca indefinitely.

## ROYAL ACADEMY OF MEDICINE IN IRELAND

AT a meeting of the Section of Medicine on Jan. 28 some observations on *Acute Nephritis* were reported by Dr. ALAN THOMPSON. He reviewed a series of 78 cases which he had treated in the Richmond Hospital during the 15 months from August, 1942, to October, 1943. In no case was there any evidence of previous renal disease. Ætiologically the cases were divided into a streptococcal group of 13 cases (mostly children) in which the disease was relatively mild, and an idiopathic group of 65 cases (with a high proportion of middle-aged persons) in which it was severe and protracted. Acute nephritis in Dublin, he said, has assumed epidemic proportions during the past 18 months. Apart from the importance of exposure and chill, the ætiology in the second group is obscure, and the age-incidence unusually high. The outstanding clinical features of the idiopathic group were: moderate or severe dropsy, often persistent for weeks; lassitude, headache and dyspnœa, the commonest initial symptoms; severe hypertension, often exceeding 200 mm. Hg, and often associated with severe bradycardia; heavy and persistent albuminuria without gross hæmaturia. Hypertensive attacks and retinal lesions were uncommon. Azotæmia was usually slight, and no true uræmic symptoms were observed. There were no deaths in this group, but convalescence was in most cases delayed for many weeks, and most of the patients left hospital with some evidence of active disease. He regarded the ultimate outlook for the group as very poor, since the acute disease was in most instances severe, and many of the patients had already reached the age of degenerative cardiovascular disease. The undernutrition prevailing in the city might be expected to favour the development of hypoproteinæmia and chronic dropsy. Treatment included the limitation of fluids and salt until diuresis was established, and the exclusion of animal protein during the acute hypertensive phase. Adequate amounts of carbohydrate and fat were given from the outset. At the earliest possible moment high-grade protein was added to the diet in an attempt to avoid undue loss of flesh, to maintain the hæmoglobin and plasma-protein levels, and to compensate for the heavy albuminuria. He considered this early return to a generous diet in cases still showing evidence of active disease to be of the highest importance. Traditional methods of treatment, he said, including restriction of animal protein, might be expected to favour such common sequelæ as debility, loss of flesh, anæmia, and chronic dropsy.

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★ *Brit. Med. J.* 1942, 1, 668.
*J. Clin. Endocrin.*, 1942, 2, 639.

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# THE LANCET

*LONDON: SATURDAY, MAY 13, 1944*


## THE TREATMENT OF BURNS

"How am I going to treat burns?" This is a question now in the minds of many of us, and it demands a plain answer. But unfortunately the experts seem to disagree. Since the middle of 1940 all writers on the subject have emphasised the importance of these injuries in modern warfare, but the methods they have recommended have often differed fundamentally. We have a choice of coagulating agents almost without number. Sulphonamides are used externally or internally or both. Some hold that a burn should be covered at once and left undisturbed for a week or longer; others advise that dressings be changed daily or even oftener. Elaborate washing techniques, involving the use of baths and envelopes, have been described in detail. Some insist on immobilisation; others say that this invites disaster and that movements must begin forthwith. And, although enthusiasts may remain forever blind to the imperfections of their own methods, there can be no doubt that satisfactory results have been achieved with a great many different remedies and regimes. The explanation is that men prepared to give time and thought to the treatment of these cases will generally be more successful than those who blindly follow a routine.

The surgeon considering what method to adopt must first think of the conditions under which he will be working. What facilities will there be for ensuring asepsis if dressings are frequently changed and the wound frequently exposed? What personnel will be available for carrying out any elaborate technique? What materials will be at hand, and what will be unobtainable? How much time will he or his assistants have to superintend treatment and determine progress? Obviously the surgeon in charge of a field surgical unit and the surgeon in a static base hospital will be facing different problems, and the man in a busy general hospital will be differently placed from one in charge of a special burns centre. In the forward area the aim must be to save life and make the patient comfortable, and yet do nothing that will seriously interfere with subsequent treatment by whatever method may be chosen. It is far better to carry out simple treatment correctly than to attempt something elaborate that does not quite come off.

In the early stages death from burns is death from shock. In so far as this shock is caused by pain, it can be lessened by morphine, given early and as often as need be. In so far as it is caused by diminution in blood-volume, it can be lessened by transfusion of plasma or serum. But, as OGILVIE [1] points out,

> "the shock of burns is not a temporary state that can be dispelled by the magic of plasma, leaving the patient safe for surgery or evacuation. Resuscitation restores the circulatory equilibrium but the adverse forces continue at work for some time, and the patient needs re-resuscitation with more plasma at intervals for days, and a constant watch on his blood-pressure and hæmatocrit readings, lest he slip into that state from which there is no recovery. Large amounts of plasma are needed, and in a severe case the first 3 pints should be run in in five minutes each, if necessary under pressure. Eight to 12 pints in the first forty-eight hours and 30 or more pints in the first five days are often required."

It is important that the rate and amount of the transfusion should be decided according to the condition of the patient; to estimate his hæmoglobin when he is first seen, and then prescribe a given amount of plasma for his subsequent treatment, is an example of the art of medicine at its worst. The loss of plasma from the circulation is a continuous process, rapid at first and sometimes lasting as long as 48 hours, and its rate is probably influenced by treatment. For the purpose of directly checking the flow of plasma into the burnt areas, the use of pressure dressings and plaster casts is increasingly recommended [2]; but before applying either of these it is wise to consider whether the patient will be under expert surveillance for the next two days, when pain might easily develop beneath them. Evacuation always needs care, and in OGILVIE's opinion cases of severe burns stand it worse than any others except abdominal injuries.[1] When it is risky but unavoidable he advises that "the patient should be sent down with a plasma drip running." [3]

Though death from shock is the first danger, it is not the last; and the majority of fatalities from burns are attributable to toxæmia and sepsis. From the beginning, therefore, it is essential to prevent unnecessary infection. In first-aid, if clothing is removed, it should be cut away and never pulled across the burnt area; but clothes covering burns are often heat-sterilised and may be better left for removal in hospital.[4] The chances of contamination by dirty fingers, or by droplets from the noses and throats of doctors, orderlies and fellow patients, must be minimised by covering the lesion at the earliest opportunity, and if possible by the masking of attendants. As an additional safeguard, sulphonamides may be applied locally (with or without proflavine) and given by mouth. In cases seen late, where infection is already established, the surgeon should use methods he already knows to be efficacious in the treatment of local infection anywhere. A dressing that allows free drainage by seeping will be needed whenever frequent changes are inexpedient. Immobilisation is likely to be as effective for an infected burn as it is for any other local infection—and as comforting. In general the decision whether or not to encourage movement in, say, a burn of the hand should be made rationally. If pain and reflex muscular spasm are caused by such movement, no good can possibly come of persisting in the attempt: the tissues are protesting, and will respond by further inflammation and exudation which will increase the likelihood of later stiffness. To continue immobilisation after the inflammatory process has settled is equally unsound, for it will delay functional recovery. Moreover, with deep burns the posture of an injured limb will require close attention, if permanent deformity is to be avoided. Happily, the prospect of such deformity

1. Ogilvie, W. H. *Brit. J. Surg.* April, 1944, p. 313.
2. Barnes, J. M. *Brit. med. J.* 1943, i, 408; Siler, V. E. *J. Amer. med. Ass.* Feb. 19, 1944, p. 486; Borden, D. L. *Surg. Gynec. Obstet.* 1944, **78**, 125; Ackman, D., Gerrie, J. W., Pritchard, J. E. and Mills, E. S. *Ann. Surg.* 1944, **119**, 161; *Lancet*, 1943, i, 619; 1944, i, 24.
3. See Lucas, H. K. *Lancet*, 1943, ii, 503.
4. Bodenham, D. C. *Ibid*, p. 725.

developing is much less now that the value of early skin-grafting is more widely recognised. It is true that no graft will take when applied over sloughs; but it is also true that every day that granulation tissue is left exposed and uncovered by epithelium increases its thickness and hence the density and subsequent contracture of the final scar. "The most distressing problem in war burns is the burnt hand," writes OGILVIE.[1] But he adds that "few burnt hands are hopeless if looked after by a surgeon with more optimism than sense, one who keeps the position of function, gets the fingers working every day, and puts grafts on partly cleaned areas long before the experts would approve. An epithelialised hand with some movement is a human thing that will improve; a claw covered with a beautiful graft has no future."

The following scheme of treatment appears practicable for surgeons working under almost any conditions:—

1. Morphine, gr. ¼–½, should be given as soon as possible, with further doses of gr. ¼ as necessary to control restlessness. Each dose must be recorded.

2. Plasma or serum drip-transfusion will probably be needed, the rate being judged by the patient's blood-pressure and general condition. Where hæmoglobin estimations are available the aim, during the first 48 hours, should be to prevent the hæmoglobin rising too much (hæmoconcentration), rather than try to reduce it to normal levels and keep it there. The patients should take as much fluid as possible by mouth, or by rectum if necessary. Oxygen may be useful.

3. In the absence of full surgical facilities, the burn should not be cleaned and blisters should be left intact. It should be covered with a sterile dressing and firmly bandaged. The dressing should be large enough, and must be well secured in case the patient becomes very restless. A sulphonamide cream may be spread over the burn first, or the dressing itself may be of some special greasy variety with a sulphonamide incorporated; but a simple dry dressing is suitable provided the material is of a smooth close mesh which will not adhere closely to granulations.

4. Cleaning of fresh burns should only be undertaken when facilities for asepsis are as good as for any surgical operation; and for anything more than a small burn an anæsthetic is essential. Soap and water is satisfactory for cleaning the skin and the burn. So is the detergent 'Cetavlon.'

5. If powdered sulphonamides are applied to the burn the amount used should be known. The powdered drug is rapidly absorbed from a fresh burn and not more than 15 grammes should be applied at one time. Weighed quantities of sterile powder can be stored, and surfaces can be dusted through a small bag made from several layers of gauze. If a sulphonamide cream is used, little of the drug will be absorbed.

6. A pressure dressing, if desired, is made by firm bandaging over a thick layer of cotton-wool placed over the dressings. Open or closed plaster casts can be applied to fresh burns on the limbs provided the limbs are elevated and proper supervision can be maintained for 2 days.

7. If the burn is at all large or evidently infected, sulphonamides should be given by mouth. If sulphonamide powder has been applied to the wound, the oral dose should be reduced correspondingly.

8. The initial dressings over a fresh burn need not be disturbed for the first 7–10 days unless pain or discharge suggests the need for further examination.

9. Burns seen late with an established infection must be thoroughly cleaned if sulphonamides are to be applied locally, for sulphonamides are inactivated by pus and tissue breakdown products. The presence of sloughs always makes the discharge worse. Some may be cut away; otherwise their removal may be expedited by leaving them under an occlusive dressing. Some believe that frequent moist dressings are effective, but these must be done under proper aseptic conditions if multiple cross-infection is to be avoided.

10. As soon as reasonably healthy granulation tissue appears the aim should be to cover it with a skin graft of some kind.

11. Where there has been a long period of infection the blood should be examined. Anæmia may develop rapidly in these cases and a transfusion may make all the difference to the patient's progress or response to operation. A good diet, with plenty of protein, is always a necessity.

It will be noted that no mention is made of tannic acid or other coagulants, and to many surgeons this may seem strange. But tannic acid has been conclusively shown to be toxic both to man and animals,[5] and recent experience in many places proves that its replacement by some simple dressing does not lead to disaster. The application of coagulants under any but ideal conditions may cause trouble with sepsis later. If tannic acid is avoided, coagulation therapy intelligently applied under proper conditions is probably as satisfactory as any other method,[6] but these conditions are unlikely to be found anywhere near a battle area.

## ARMS AND LEGS

A MARTIAN might be taken aback by the energy with which we knock limbs off and the tenderness with which we replace them. A substitute limb is inevitably inferior to the original, but at Queen Mary's Ministry of Pensions Hospital, at Roehampton, art gains upon nature every year. Many of the craftsmen in the workshops are short of one leg; some lack both, and there are even one or two who have lost an arm. They are not disabled, scarcely inconvenienced. Patients are less distressed by the loss of a leg than of a hand, for legs have reached a high pitch of utility and elegance, and patients, especially if they are children or young folk, learn to manage them quickly—in fact they often walk away on them on the day they are fitted. The work of limb-fitting is carried out by two firms contracted to the governors of the hospital and having workshops easily accessible to the medical staff in the hospital grounds: Messrs. J. E. Hanger and Company who make legs and Messrs. Hugh Steeper Ltd., who make arms. Each leg is specially designed for the person who is going to wear it. If it is a single leg it matches the fellow of the opposite side; the socket which supports the stump is exact; the rim upon which the patient sits (for the stump takes no weight) is beaten out by hand in aluminium or moulded in leather to match his contours. Small metal parts for the knee and ankle joints are turned on lathes, but otherwise limb-making is largely done by hand—workers in leather, metal, and wood, machinists, platers and finishers all taking part. The socket is made to match a plaster cast of the stump. In below-knee amputations a wooden model is made of the thigh on which the damp leather of the corset is first stretched and later stitched. The metal parts of the completed limbs are sprayed with cellulose, or chromium-plated. Wooden feet are fitted with a stout rubber joint at the level of the metatarsal heads, allowing the foot to bend like a live one at each step. When a femur has been disarticulated the patient's pelvis rests in a tough light washable cradle made of linen painted with 'Pexuloid' or some other such preparation.

5. *Lancet*, March 11, 1944, p. 344.
6. Logie, N. J. *Ibid*, 1943, i, 609.

In leg-making weight bearing and balance present the chief problems; in the arm the main consideration is dexterity. A man with only 2–3 in. of his humerus left can easily manage all the movements of a modern artificial arm. He is provided with several attachments besides the hand, which is mainly for appearance though it can be used for writing, knitting, holding small objects, and playing billiards (in which it outclasses the live hand as a steady rest). A hook, split along its length, acts as a pair of tongs capable of lifting a pin, and is controlled by the muscles of the shoulder girdle. Comb, razor, toothbrush and scrubbing brush can in turn be quickly and simply locked in place on the forearm. Another fitting makes it possible to use a spade or a cricket bat. A small dressing case of equipment puts writing, feeding, dressing, shaving and washing within the compass of those who have lost both hands. Dr. JOHN CRAFT who, on another page, describes his experience of fitting children with prostheses believes that the patient who loses a right hand should never bother to learn to write with his left: the muscles of the upper arm and even of the shoulder girdle are capable of undertaking the necessary movements, and he can write as soon as a pen is fixed to the end of his prosthesis. Children are adept at managing prostheses, and nothing could be more unfounded than the belief that they are not suitable candidates for a properly made leg during the growing years. At Roehampton legs for children are made with telescopic shins to allow for growth. Their gait through life depends on a good artificial limb, lengthened as necessary during the growing years. A child who has been given a substitute, like a fibre limb or a pylon, aequires bad habits in walking which are difficult to eradicate.

The work at Roehampton, as such work always must, has received a fillip from the abundant opportunities provided by war. Under that stimulus ideas and improvements develop quickly and are put into practice with little delay. But increased work has meant slowing of output, because personnel in the two factories, instead of growing to meet the new demand, has suffered the drain of war. Britain is acknowledged to lead the world in this particular aspect of re-ablement, yet the output of work is even now falling behind, and patients are having to wait longer for their limbs than they would in peacetime. This merits serious consideration; and an even larger issue must also come under review. After the war enormous numbers of limbs will be needed throughout the world. Roehampton can show how to make them, and on the suggestion of Kathleen Lady FALMOUTH, has already opened its doors to doctors and technical workers of the allied nations, several of whom are now taking courses of training there. There remains the question of whether this country should attempt to supply limbs, or parts of limbs, to the many lands which will need them after the war. Clearly, if this is to be attempted, the individual approach now practised at Roehampton would have to give way to some of the methods of mass production. This would be unfortunate, but far less unfortunate than complete denial of prostheses to a generation of mutilated people. There could be little serious objection to standardisation and quick methods of manufacture of those parts of the limb not in actual contact with the stump. The proper fitting of the stump itself would have to be entrusted to assistants trained for the purpose and sent out to the various localities. What developments are possible along these lines will be of course for the Ministry of Pensions and the workers at Roehampton to decide between them. That a great opportunity is close upon them seems fairly evident.

## A GERMAN WOUND ANTISEPTIC

THE close watch that has been kept on enemy publications and practice in this war has yielded astonishingly little in the medical sphere. This is the more remarkable when we consider the well-merited reputation of German science in the past, and the notable advances made in Britain and America in the last few years. It may be that the Nazi regime has been particularly unfavourable for medical discoveries; or German medical workers may have been too closely occupied with more immediate war duties to find time for research; or, less likely, their system of official secrecy may have prevented the major discoveries leaking out. One of the few exceptions is the development of 'Marfanil,' a sulphonamide-like compound now used extensively in the German armies for local application to wounds. It was first investigated in America, as one of a long series of drugs, and was turned down because its activity against streptococci in mice was low. Its properties were described in America by MILLER and his colleagues[1] in 1940, and in Germany by KLARER[2] in 1941; since then many references to its use have appeared in the German journals, the more important of which have been abstracted in the *Bulletin of War Medicine*. It is issued in Germany as a powder for local application, either neat or diluted with 9 parts of sulphanilamide, and as tablets with equal parts of sulphanilamide. The compound has been investigated experimentally by BUTTLE in North Africa, and by the Medical Research Council in this country, and the quantity captured in North Africa has been given a clinical trial by MITCHELL, REES and ROBINSON, who set out their results in this issue.

Marfanil, formerly known as 'Mesudin,' is 4-aminomethyl-benzene sulphonamide, $H_2N{\cdot}CH_2{\cdot}C_6H_4{\cdot}SO_2{\cdot}NH_2$. It differs from sulphanilamide and the other common sulphonamides in having the amino group ($-NH_2$) separated from the benzene ring ($C_6H_4$) by a methyl group ($-CH_2-$). As a consequence it cannot be estimated by Marshall's method. Its antibacterial action is not inhibited by pus or other wound discharges, and it is not antagonised by *p*-aminobenzoic acid in vitro, though LINK[3] says it is in vivo. Antagonism by *p*-aminobenzoic acid in vitro is, of course, a characteristic of "true" sulphonamide action, and its absence in marfanil suggests that the compound acts on some different part of the bacterium. Marfanil-resistant strains of bacteria are not resistant to sulphathiazole, and the converse is true, another indication of the fundamental difference in the action of these compounds. Marfanil is agreed to be much less active than sulphathiazole against streptococci and staphylococci, but DOMAGK[4] claims that it is

1. Miller, E., Sprague, J. M., Kissinger, L. W. and McBurney, L. F. *J. Amer. chem. Soc.* 1940, **62**, 2099.
2. Klarer, J. *Klin. Wschr.* 1941, **20**, 1250. Abstr. *Bull. War Med.* 1942, **2**, 504.
3. Link, T. *Klin. Wschr.* 1943, **22**, 364.
4. Domagk, G. *Dtsch. med. Wschr.* 1943, **69**, 379.

much more active than the true sulphonamides against anaerobes, a statement disputed by SCHREUS and his co-workers.[5] Probably the methods of testing and the amounts of pus and *p*-aminobenzoic acid present largely determine whether it is more or less active in vitro than the true sulphonamides, but it seems to be second only to penicillin against *Cl. welchii* and much less effective against the other anaerobes. It is said that against gonococcal infections it is almost the equal of 'Uleron,' and that it persists in wounds for 48–60 hours after insertion, about the same time as sulphathiazole, though with its high solubility one would expect absorption to be rapid.

The chief advantage of marfanil in the treatment of wounds is that its action is unimpaired by the presence of pus, and this was confirmed in MITCHELL'S series. Neither the Germans nor ourselves have yet compared it with a control series treated with the usual sulphonamides or acridines, but MITCHELL and his colleagues were satisfied that it was more effective in checking or eliminating established sepsis than any applications they have tried, with the single exception of penicillin. In most cases, though not all, it rapidly eliminated streptococci and staphylococci from the infected wounds, and sometimes after a few applications no growth was obtained even when the infecting organisms included proteus and pyocyaneus, which are normally resistant to local applications. It was found useful in deep septic burns, but less effective than triple-dye-soap in more superficial ones. The only evidence of irritation was the appearance of blisters in two cases of burns; otherwise there was no sign that it interfered with healing and epithelial growth, and it seemed to be no more toxic than sulphanilamide. Here then is a possible alternative to penicillin and the proflavine-sulphathiazole mixtures for application to infected wounds particularly for highly purulent cases of chronic sepsis. It is largely inactivated in the bloodstream, so is unsuitable for systemic administration. And there is one serious objection, which it shares with penicillin—it is difficult to produce.

### BATTLE SURGERY

Major-General Ogilvie's book, *Forward Surgery in Modern War*,[6] a chapter of which was published in THE LANCET of April 29, sets out the views he has formed on the primary treatment of battle casualties during three years as consultant surgeon in East Africa and Abyssinia, Middle East and the Western Desert. It is mainly intended for the general surgeon in the Services who is new to the surgery of war wounds, but the many civilian surgeons who are also preparing to give treatment, if not primary treatment, to battle casualties will also welcome this personal account of methods which have proved their value in the field.

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Sir COMYNS BERKELEY has been re-elected chairman of the Central Midwives Board.

Dr. J. A. CHARLES has been appointed a deputy chief medical officer in the Ministry of Health.

The MEDICAL REGISTER for 1944 contains 71,882 names, more by 2454 than a year before and 10,462 more than the last year of peace. Of these 3058, being 4·25% of the whole, are registered for the duration of the war.

5. Schreus, H. T., Brauns, A. and Schümmer, H. *Ibid*, 1941, **20** 1233. Abstr. *Bull. War Med.* 1942, **2**, 447.
6. London: Butterworth. Pp. 96. 10*s*. 6*d*. (For serving officers, 5*s*. 6*d*.)

## Annotations

### WOMEN IN WAR INDUSTRY

THE weight, height and hæmoglobin of a great number of women munition-workers have been studied by Dr. Daniel Davies and his associates.[1] Their report is reassuring in that remarkably few defects were found. Married women are carrying much of the industrial burden of the war, and the wonder is that they are able to do two difficult jobs so well. Nevertheless many feel the combined strain of long journeys, work in the factory, and domestic duties. The investigators record that a group of 2000 (half living at home and half in hostels) showed an overall incidence of 5·7% of anæmia (hæmoglobin 11 g. per 100 ml., equivalent to Haldane 74% and below), and that 10·3% of the married women were anæmic, though surprisingly few complained of ill health. This incidence of anæmia in workers exposed to toxic risks in factories where there is a full medical service emphasises, as the investigators remark, the need for the routine estimation of hæmoglobin in people who appear pale. Comparison with prewar and earlier surveys may justify satisfaction, but anæmia in 10% of the married women of this country would represent a great volume of ill health.

A dietetic survey of the food intake of women living in hostels confirmed the popularity of the "snack," even where canteen meals were served. Despite what seems to have been an almost endless supply of food, the vitamin-C intake was grossly deficient, and there were also deficiencies of vitamin A, riboflavin and nicotinic acid. Night workers ate less than those on day shifts. On the whole, the weight and height of 10,000 women, judging by a comparison with prewar American insurance figures, were good, though the older ones seem to be taller and thinner than their American sisters. Women doing heavy work in an engineering factory lost weight, but further investigation is needed to decide whether the increased expenditure of energy demanded a higher food intake than they achieved. Another possibility is that women are not really fitted for men's work.

So detailed a survey of the weight, height and hæmoglobin of women in war—albeit a highly selected group—should not be lost in Government archives, and a copy should be available in all medical libraries, at home and abroad. The fact that health cannot be assessed solely in terms of weight, height and hæmoglobin, and the picture they present may be a little too favourable; but this monumental report will certainly provide a useful datum line for future inquirers.

### MASS ELECTROCARDIOGRAPHY

IT is steadily being borne in on us how little we know about health as opposed to disease, and how difficult it is to detect disease in the earliest stages. As the public becomes increasingly health-conscious we are going to be asked more and more to exclude disease rather than to attach a name to established symptoms. In the early detection of heart disease the electrocardiogram should be of considerable assistance, but that the normal limits are by no means clear-cut is amply demonstrated by an American investigation.[2] Electrocardiograms were obtained from 500 unselected subjects between the ages of 18 and 38, consisting of medical students, nurses and hospital employees, the sexes being equally represented. All were classified as healthy after a full examination that included radiological examination of the chest and a Kahn test on the blood. The three conventional leads and one chest lead ($CF_4$) were recorded in each case, and, with certain minor exceptions, the criteria of normality were those compiled by the New

1. Davies, D. T., Gunson, E. B., Matheson, A. and Pyke, M. Some Observations on the Health of Munition Workers. Ministry of Supply, London.
2. Viscidi, P. C. and Geiger, A. J. *Amer. Heart J.* 1943, **26**, 763.

York Heart Association.[3] The wholly unexpected result of this investigation was that only 244 of the 500 records (48·8%) were "normal." A further careful examination of the subjects with abnormal records was therefore made, as a result of which 14 were found to have some abnormality of the cardiovascular system. The final result was that of the electrocardiograms obtained from 486 apparently normal subjects, only 50% were normal, 40% were abnormal and 10% borderline. The commonest abnormalities were slurring of QRS in two or three of the limb leads (28 records), abnormal direction or amplitude of T in the limb leads (21 records), abnormally long Q–T interval (85 records), low voltage of QRS in chest lead IV F (78 records), abnormal direction or amplitude of $T_4$ (19 records). It may well be argued that no clinician is going to condemn a cardiovascular system on the basis of any of these abnormalities, unless there is supporting clinical evidence; but times are changing, and even now high standards are being set to ensure that the men chosen for some flying and military posts are the fittest possible. In the postwar period the position is going to be very similar in an attempt to carry preventive medicine into practice. Two lines of action suggest themselves. The criteria of normality must be reinvestigated; and until this has been done routine electrocardiography must be used with caution and a solitary slight electrocardiographic deviation from the "normal" must not bias the clinician's final opinion.

## HERRICK AND CORONARY THROMBOSIS

A REMARK in our review of James B. Herrick's excellent little *History of Cardiology*—that its main defect was the absence of adequate reference to the work of James B. Herrick—helped to persuade him to relate his early experiences with coronary thrombosis.[4] The story is a good illustration of how slowly new ideas permeate the profession and of the lessons that can be learnt at the bedside. It was in 1910 that Herrick made his first clinical diagnosis of coronary thrombosis, a diagnosis that was confirmed by necropsy. John B. Murphy was called in to give an opinion, and there is a vivid picture of him and Herrick passing the night in the patient's house. They shared the same bedroom and spent the greater part of the night in conversations such as this. "Herrick, are you awake? Say, are you sure about there being no pneumothorax?" A little later, from Herrick's bed would come, also in a stage whisper, "Dr. Murphy, do you think this might be an acute pancreatitis, or possibly a strangulated diaphragmatic hernia?" After the necropsy the pathologist rang up Herrick: "The clot was in the coronary artery all right. But how in God's name did you guess it?" Herrick modestly adds that "perhaps guess was the right word," but it is obvious from this intimate personal record that the diagnosis was based on sound clinical acumen and experience and a careful study of the published work. The electrocardiograph, of course, was not available in those days; it was not until 1917 that Herrick made his first electrocardiographic diagnosis of coronary thrombosis, after his collaborator, F. M. Smith, had worked out the appearances experimentally. Herrick read his first important paper on coronary thrombosis to the Association of American Physicians in 1912, but little interest was taken in the subject until 1918, when he read another to the association. There is, for instance, the description of Charles Mayo listening to Herrick stressing the resemblance of coronary thrombosis to acute abdominal surgical conditions: "I can still see the quizzical look on Charlie Mayo's face as, from a front seat, he listened to, but was evidently not converted to, my sermon." Then there is the Chicago physician who in 1917 told a doctor patient in whom Herrick had diagnosed coronary thrombosis (subsequently confirmed by necropsy) that "neither Dr. Herrick nor anyone else was justified in making such a diagnosis except on the autopsy table. The attempt was ridiculous because it was impossible." Ten years later, says Herrick, "this same physician called me by telephone and in a feeble voice and in evident alarm told me he had just had an attack of coronary thrombosis, and what would I advise." In these days when coronary thrombosis is diagnosed every day in practice and every student knows its signs and symptoms we should not forget the physician who, without instrumental aid, established it as a clinical entity rather than a post-mortem finding.

3. Criteria Committee of the New York Heart Association, *Nomenclature and Criteria for Diagnosis of Diseases of the Heart*, 4th ed. 1939. 4. Herrick, J. B. *Amer. Heart J.* 1944, **27**, 1.

## SERVICE OF YOUTH

OF the seven ages of man, which haven't changed much since Jaques enumerated them in 1599, the mewling infant has been taken on by the pædiatrist, the second childishness by the Nuffield Trust, and the others have not got on so badly by themselves; but it has been left to Sir Arnold McNair and his nine fellow educators to frame a plan[1] for filling the gap which confronts the boy and girl leaving school with morning face still shining but not yet fit for lovering or soldiering. The war-time conception of man-power has brought them suddenly into the official eye. During five months of 1943 the LCC, with the help of a band of voluntary workers, registered 22,570 "young persons on attaining the age of 16 years," as B of E circular 1635 describes them (to have added not yet "gainfully employed" would not be quite true). It was found that while 1860 of this group were still receiving full-time education or attending continuation classes, and 7029 had joined youth or pre-Service organisations, there were 12,098 unattached to any such organisation, and the "Service of Youth" committees after interviewing 6374 of them advised 4949 to join. The young people themselves accepted this shepherding without resentment even when cinema, fun fair or dance hall had been their only idea of spending leisure time. Many of them responded readily to the suggestion they should join a social group; refusal was exceptional, few showed no sense of duty or obligation to the community. But a number both of boys and girls said they had little or no time left after finishing their work and often with a long way to travel home, and the girls looked tired.

History has been hard on organised youth service. The Fisher Act which enjoined local education authorities to supervise the leisure as well as the class training of the early school-leaver was the first casualty of the 1918 peace. The supervision was sporadic except for the admirable work of the special commissions for distressed areas, and the Physical Training and Recreation Act of 1937 was the first casualty of the 1939 war, so far as its "national fitness campaign" was concerned. But the Youth Advisory Council (as it is now called) got to work in October, 1939, and devised partnerships between education authorities and voluntary youth organisations all over the country. The staffing of this work is part of the long-range programme which the McNair report foresees will take years to work out, despite the example set by unaided voluntary effort in many places. Voluntary workers, the report says, are still vital to the scheme because

(*a*) they bring to young people a varied experience of contemporary life which full-time workers clearly cannot bring in the same measure;
(*b*) voluntary work carries with it the hall mark of altruistic interest and sets an example of unrewarded service which young people are quick to appreciate;

1. Board of Education: Teachers and Youth Leaders. HMSO. 1934. Pp. 176. 2*s*. Part II (pp. 93–107) is entitled "The Service of Youth and Young People's Colleges."

(c) the work of volunteers is a safeguard against over-professionalisation of the service.

There is no recognised qualification for a youth leader. A 3-year course of study and practice is suggested, at the end of which the leader should emerge with five qualities: (1) personal accomplishment in some craft or field of knowledge; (2) insight into social and industrial conditions; (3) some understanding of psychology; (4) enjoyment of young activities; (5) experience of work among young people. Jaques should come back and look round in a year or two. We hope he will be impressed.

## DETECTION OF SULPHONAMIDES IN URINE

SINCE methods for estimating sulphonamides in blood and urine were first described in 1937 by Fuller, by Marshall and his colleagues, and by others, much ingenuity has been applied to modifying and improving them. Some of the alterations, intended to remove possible causes of error, introduce more complications than they are worth; but many helpful contributions have been made. The special difficulties in the estimation of sulphathiazole have been discussed by Sunderman and Pepper.[1] One simple rapid method,[2] suitable for use when laboratory facilities are lacking, employs tablets of reagents, prepared in the correct amounts, and a wedge of coloured lucite to match the colour. Estimation in bile presents special difficulties, but the bile-pigments can be precipitated by zinc sulphate and potassium carbonate.[3] Several different methods of micro estimation have been described [4]; for these, blood can be obtained by stabbing the finger, and there is no need to puncture a vein. Simple bedside methods, using a strip of paper impregnated with Ehrlich's reagent (*p*-dimethylaminobenzaldehyde in acid solution), have been devised for blood by Fuller [5] and for serum by La Rosa.[6] A simple test for detecting sulphonamides in urine, described by Bogen [7] and by Hubata,[8] depends on the fact that in the presence of acid a colour reaction occurs between crude cellulose (newspaper, matchsticks, pine shavings) and the arylamine group, $C_6H_4.NH_2$.[9] The test is carried out by moistening a small area on a blank piece of newspaper with a drop or two of urine, and placing a small drop of hydrochloric acid (diluted 1 in 4) on the centre of this area. The immediate appearance of a yellow to orange colour indicates the presence of a sulphonamide compound. Paper made from refined pulp, such as white bond, will not give the reaction. A faint yellow colour is given by urine containing 0·25 mg. per 100 c.cm., this being the smallest amount detectable; orange-yellow corresponds to about 25 mg. and an orange colour to 50 mg. and upwards per 100 c.cm. The test appears to be fairly specific and a positive result is not obtained from the urine of patients taking acetyl salicylate, phenobarbitol, codeine or similar compounds. All the commoner sulphonamides can be detected by this means. Previously the simplest way of detecting sulphonamides in urine was by Werner's method,[10] in which the urine is diluted and acidified, and a small amount of Ehrlich's reagent is added. The new method avoids the dilution and the need for a reagent which is not always available. Presumably its chief use would be under conditions of military service, where patients reach hospital often without any reliable history of their previous medication. The same situation might occasionally arise in civilian hospitals in this country. Examination of the urine in this way will show whether a sulphonamide has been given, and will indicate roughly whether much or little is still present in the body. After a standard course of sulphonamides a faint yellow colour is obtained from the urine for six days but there is no colour change by ten days. For the control of treatment the test is of course no substitute for proper estimation of the concentration of sulphonamide in the blood by the usual laboratory methods.

1. Sunderman, F. W. and Pepper, D. S. *Amer. J. med. Sci.* 1941, **200**, 790.
2. Sheftel, A. G. *J. Amer. med. Ass.* 1941, **117**, 439.
3. Carryer, H. M. and Osterberg, A. E. *J. Lab. clin. Med.* 1942, **28**, 110.
4. Churg, J. and Lehr, D. *Amer. J. med. Sci.* 1941, **202**, 687. Jorgensen, G. M. *J. Lab. clin. Med.* 1942, **27**, 1355. Lee, S. W., Hannay, N. B. and Hand, W. C. *Industr. Engng. chem. Anal.* 1943, **15**, 403.
5. Fuller, A. T. *Lancet*, 1942, i, 760.
6. La Rosa, W. V. *Proc. Soc. exp. Biol., N.Y.* 1943, **53**, 98.
7. Bogen, E. *Nav. med. Bull. Wash.* 1943, **41**, 1135.
8. Hubata, R. *War Med.* 1944, **5**, 56.
9. Hannay, L. I. *Virginia med. Mon.* 1942, **69**, 334.
10. Werner, M. *Lancet*, 1939, i, 18.

## THE CHURCHILL HOUSE

LACK of skilled labour makes it unlikely that more than 300,000 permanent houses will be built in this country in the first two years after the war ends in Europe. This is less than the number built each year before the war, and will do little to overtake present arrears in housing. So that young couples shall wherever possible have a home of their own the Government has decided to provide several hundred thousand stopgap houses, to be publicly owned and licensed only for a limited time. Their constituent parts will be made in factories now engaged on war production, and they can be erected in a few days.

A prototype, designed under the auspices of the Ministry of Works by Mr. C. J. Mole and Mr. Arthur Kenyon, FRIBA, has been erected in London near the Tate Gallery, for inspection by authorised visitors. It is of steel construction, insulated by aluminium foil which should diminish heat in summer or cold in winter. The exterior, with its well-spaced windows, is not unpleasing. From the only door a passageway leads to the living-room and kitchen, which are in the middle of the house at front and back. The living-room (14 ft. 3 in. × 10 ft. 1½ in.) has a small built-in bookcase, some ingenious cupboards, and an excellent stove, burning coal, coke or anthracite, which heats the domestic water and can be used as an open fire. The kitchen (10 ft. 2¼ in. × 7 ft. 3½ in.) is remarkably compact: on one side is a gas (or electric) stove, a deep porcelained sink with hot and cold taps and with two draining-boards, a gas-heated copper, and a small electric refrigerator, with storage space for pots and pans; on the other is a series of built-in cupboards for cleaning utensils and crockery, and an ironing-board which folds neatly out of view. Beyond the living-room and kitchen are the two bedrooms (each 12 ft. 5½ in. × 10 ft. 1½ in.) again achieving miracles of built-in wardrobe space. The height of all the rooms is only 7 ft., but the good lighting and ventilation obviates the main objections. The fittings in the bathroom (where "smalls" can be washed) and the separate W.C. are of good quality, and nearby is the linen cupboard heated by an electric coil. Behind the W.C. is a cupboard or shed, with external access only, which will take two or three bicycles without difficulty, but unfortunately seems too small to take a perambulator of normal size. Indeed, with only two bedrooms the house itself is too small to take a family of what should be normal size; quite apart from the noise that a normal family would make by beating on the metal walls. To those, however, who remember the converted Army huts which had to serve hundreds of thousands of people as houses at the end of the last war—many of which are still, unfortunately, serving the same purpose—the new Churchill house will appear miraculous. Given these houses, any town which has at its command a reasonable amount of space will have no difficulty in satisfying the aspirations of the thousands of young people who, at the end of this war, will want a home of their own, where they can live with some degree of privacy and comfort. Despite forebodings it is clear that a prefabricated house can be made in every sense a home.

## Special Articles

# PROSTHESES FOR CHILDREN

A. W. J. CRAFT, MRCS

LIMB SURGEON AT QUEEN MARY'S (MINISTRY OF PENSIONS) HOSPITAL, ROEHAMPTON

MY main object in writing this article is to bring to the notice of all school medical officers, medical officers of health and tuberculosis officers, children's hospitals, orthopædic hospitals and all authorities who have any responsibility for the surgical care of child amputees, the scheme approved by the Government to provide each child with a correct type of artificial limb.

Ministry of Pensions limb surgeons find great advantage, from the psychological, physical and economic aspects, in fitting a child with an artificial limb at the earliest possible age. It is a mistake to delay such fitting until he has stopped growing.

### SCHEME FOR PROVIDING LIMBS

The scheme is sponsored by the Board of Education and the Ministry of Health, at whose request the Governors of Queen Mary's Hospital have placed their facilities for the supply of artificial limbs (made by the governors' contractors) at the disposal of local education and child-welfare authorities. The Ministry of Pensions have also agreed to allow local authorities to use the services of the Ministry's limb surgeons, hospitals and limb-fitting centres.

When a child already under the care of a local authority needs amputation, the authority asks the Ministry of Pensions to transfer him to one of the Ministry's hospitals, where the operation would be done or where the stump can be prepared and arrangements made for the making and fitting of the artificial limb. For a child not being treated under a local authority—for example, a child admitted to hospital after accident—arrangements have been made for hospitals to notify the Board of Education, which will forward the information to the appropriate local education authority or the child-welfare authority, depending on the age of the child.

The full cost, including the cost of treatment, artificial limbs and incidental travelling, is recovered by the governors of Queen Mary's Hospital from the appropriate authority which in turn makes such charge to the child's parents as may be determined. The repair and maintenance of an artificial limb supplied under the scheme can be carried out by the governors' contractors at the request of the parents, who are normally expected to bear the cost of repair and maintenance.

### THE CHILD WHO NEEDS A LIMB

There seems to be little information available about the treatment of child amputees. The following notes are based on intensive study and practical work over some years at Roehampton.

It has been distressing to see the high percentage of child amputees who are given a poor form of temporary appliance and allowed to make continual use of it for a long period, without any necessary repairs or suitable adjustments being made as the child grows. Still more distressing is the fact that so many people who are in a position to recommend a suitable and correct prosthesis declare that the fitting of normal artificial limbs should be left until the child has completed growth.

This situation must be influenced by the cost of limbs. A correctly designed prosthesis for any amputee, child or adult, is certainly expensive. In every case the limb should be prescribed by a surgeon who has a knowledge of artificial limbs and their use; every limb must be distinctly specified and made for each patient: limbs cannot be mass-produced. A child is always growing, and he and the limb must be periodically examined. The length of the limb must be altered to conform with the growth of the normal leg, and will require some adjustment in the upper and lower part to ensure that the knee-centre of the artificial limb is kept level with that of the normal leg. The circumference and shape of the stump changes, entailing suitable alterations, sometimes replacement, of the socket; the foot on the natural leg grows, so that the artificial foot must be enlarged—one cannot buy odd shoes, apart from wearing them. As the child grows, the natural knee-joint grows, and a larger knee-joint on the artificial limb may be needed from time to time. A child with an artificial limb joins in all the games and work which normal children enjoy; the prosthesis may have much heavier duties and rougher usage than an adult would impose on it, and this again adds to the cost of maintenance.

Some children have been fortunate enough to obtain a correct prosthesis; this will necessarily require periodic repairs, which may take 6 weeks or longer, during which time the child must get to school or he will be left behind in school work. It is unfair to him to make repairs during holidays. A duplicate limb is economical though it may appear more expensive in the first place; a single limb in constant use tends to become badly damaged and worn, sometimes beyond repair.

Parents can seldom afford all this expense, which seems the chief reason why children are not given a limb to start them correctly in life. With the new scheme, these costs can be adjusted and the child amputee adequately treated.

Children having lost a leg from disease, accident, congenital absence or limb deformity are often seen getting about on a pair of crutches. Others have a form of pylon for an above-knee amputation or a peg-leg in below-knee cases. Little adjustment can be made to any of these appliances. Consequently, apart from the bad gait acquired, which is difficult to eradicate, serious skeletal deformities develop.

Child amputees are mistakenly classed as cripples, often being sent to special cripple schools; whereas they are only temporarily disabled until fitted with the correct limb. Wherever they may be they are segregated from their more fortunate companions and this segregation cripples them mentally. Arm amputees are less fortunate than leg cases, since very few children are thought capable of using an artificial arm.

Of all the reasons put forward against fitting a prosthesis to a child, the weakest and most erroneous is to say he cannot control or use it correctly. A child is naturally a very apt and able pupil, and without any exception it has been shown he quickly learns to use the prosthesis as well as, if not better than, an adult. Children fitted soon after amputation will walk almost naturally and use an arm with excellent control. Cases left a long time after operation and then fitted with temporary appliances acquire and retain a bad gait and an abnormal use of the limb. As a parallel example a person learning any sport incorrectly needs a great deal of re-education.

Any child can be fitted with an artificial leg from the age of 3, but it is better to leave the fitting of an arm until he is 5. At Roehampton for many years there have been arrangements for supplying limbs to children at the request of various bodies such as the LCC and railway companies, &c.; results with these patients have confirmed the opinions set out here.

During air-raids many children have unfortunately lost limbs. They have been provided with prostheses at Government expense through the Ministry of Health, making use of the Ministry of Pensions organisation at Roehampton. Every child is a complete success. Normal schooling is resumed, the mentality of the patient is undisturbed and all sports are enjoyed. These results refute the statement that children cannot use a prosthesis; and the question of costs can now be overcome.

### CHOICE OF AMPUTATION SITE

A child may lose a limb from a variety of causes, the most common being accident. Bone diseases necessitate a large number of amputations, and congenital deformities must now be considered more than in the past, when children were left untreated, or in some cases fitted with poor temporary appliances. During recent years more children than ever before have been fitted with correct artificial limbs, and careful records have been kept in the hope of establishing some principles regarding amputations and amputation sites. In cases of accident it may be necessary to amputate immediately to save life, but in such cases fuller consideration might be given to the length and type of stump and also the position

of the final scars. Such points make a vast difference to the success of limb-fitting. Operating surgeons often lose sight of patients after they leave hospital, and do not encounter the problems which arise.

The bones of the extremities serve several purposes apart from providing the central axis. The leg bones support the weight of the body in standing and walking, and provide the levers essential for locomotion. The arm bones, besides providing the lever for movement, give attachment to the muscles controlling the complicated movements of the arm and hand.

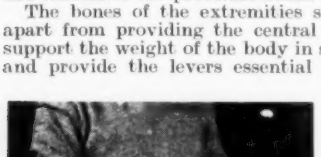
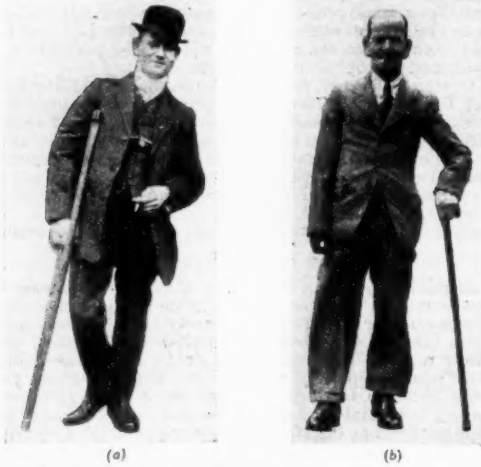


Fig. 1—Pencil attached to stump with bandage.

In the normal leg growth is mainly at the proximal ends of the tibia and fibula and at the distal end of the femur; whereas in the arm, growth is greater at the proximal end of the humerus and distal ends of the radius and ulna. An amputation of the lower leg does not entirely stop the growth of the cut tibia and fibula. The lower growing ends are removed and there is necessarily some calcification over the cut ends of the bones. An amputated humerus also grows to some extent, but a femur does not seem to grow after amputation, nor do the amputated radius and ulna. In all cases calcification runs upwards along the muscle insertions forming a spur of bone which often gives rise to pain in the stump. This has been proved from radiograms and stump measurements taken at varying intervals on the same patient.

In view of these facts I suggest that as much of the femur as possible should be left, when operating on children, to provide at least 8 in. measured from the great trochanter, 10 in. if it can be obtained. The stump need not be longer. This ideal length may be impossible to achieve on account of some pathological state of the femur demanding removal of more bone. If this is the case, it is best if possible to spare the head of the femur which assists in correct limb-fitting later. A through-knee or a Stokes-Gritti operation has been suggested for child amputees. This is quite correct, but only as a temporary measure for reamputation at a later date. It allows the femur to grow naturally in length, keeping pace with that of the other side; and an ideal stump can be obtained when the femur has grown sufficiently for 10 in. to be left on reamputation. This second operation is not always carried out, however, and the temporary prosthesis gets constantly renewed throughout life. A correct amputation with the proper artificial limb would give a better gait and enable the patient to be more normal in all activities.



(a) (b)

Fig. 2—(a) Case 1 walking with deformed limb and crutch. (b) The same man, aged 56, walking with artificial leg. (Fig. 2 (b) is reproduced by courtesy of the *Daily Herald*.)

In amputations below the knee, the ideal length for an adult is 5¼ in. measured from the inner articular surface of the head of the tibia to the cut end of the bone. This length can be obtained in many children and the extra inch which often grows will be no disadvantage. If 3–4 in. of tibia can be left in a child the extra inch or so of growth will give a normal length later, providing a stable and useful propellant stump. Little weight is now taken below the knee-joint, the stump only acting as a lever to guide the prosthesis backward and forward. The fibula should be cut an inch shorter than the tibia in young children, and the head of the fibula should not be removed except for pathological reasons.

The ideal site of amputation of the humerus is the distal end of the middle third, and records of such amputations in children show that the bone increases by 1–2 in. in length. If more of the humerus is to be removed the resultant stump must be such that at least 1 in. of humerus is left below the anterior axillary fold. This short stump grows very little, but it is just sufficient to enable an artificial arm with a socket to be fitted and for the stump to control the use of the prosthesis.

In the upper arm one should avoid transcondylar and through-elbow amputations—there is not the same reason for these operations as for a through-knee.

Fig. 3—Case 2 showing congenital deformities of hands and feet.

Amputations below the elbow do not increase in length and a final result should be obtained from the primary operation. Both very long and very short stumps are to be avoided, not so much on account of circulatory disturbances but to enable a satisfactory arm to be fitted. If the limb is amputated through the distal end of the middle third of the forearm no further attention is required as a rule, and excellent leverage is obtained. The radius should be 1 in. shorter than the ulna, and the terminal scar, from equal flaps, must be across the ends of the bones. If only a short stump is possible sufficient area must be allowed in front of the antecubital fossa, from the bend of the elbow to the end of the stump, for the socket of the limb to be fitted and used when the forearm is flexed. In a child this should be at least 2 in. As the upper arm develops the area will be somewhat reduced by the growth of the biceps.

Excluding disarticulation of the hip-joint in some female patients, and disarticulation at the knee-joint as a temporary procedure in children only, all disarticulations through joints should be entirely avoided. Long amputations break down owing to vascular disturbances and prevent a child from attending school.

## SCAR AND STUMP

In a previous article[1] I have made suggestions about the position of amputation scars and about further surgery on amputated stumps. It is vitally important to avoid scar-tissue at any position of pressure, friction and weight-bearing, especially in children because they are so active that they quickly cause lesions of incorrectly placed scar-tissue.

It was formerly the custom to allow a child to lie in bed with the stump supported in a comfortable position until the sutures were removed; a few days later he was given crutches. The idle time in bed allowed the musculature of the stump to lose tone and produced flexion of the joint above the amputation. Leg amputations in children, as with adults, should be kept in full extension for 2 days after the operation; on about the third day slow movements of the stump should be encouraged, to exercise the hip-joint in thigh cases, and the knee- and hip-joints in below-knee amputations. The range of movement of the stump is increased daily,

1. Craft, A. W. J. *Brit. med. J.* 1942, ii, 389.

also the time during which the exercises are carried out. Beginning with only a few degrees of movement, for a period of 5 minutes or so, exercises are gradually increased until full movements of all joints in the amputated limb are obtained in about 10 days, or when the sutures are taken out. The dressings are not removed and the operation wound is undisturbed, and healing is quicker than in the idle stump. After the sutures are taken out the stump should be bandaged with crêpe bandages in the manner described elsewhere.[1] In small children it is only necessary to use a bandage 4 in. wide for thigh cases, 3 in. wide for below knee and possibly a 2 or 2½ in. bandage for the arm. Older children will, of course, require wider bandages.

A child does not rest so quietly in bed as an adult and the bandage quickly becomes loosened; it must be tightly reapplied many times during the day and certainly before the patient sleeps at night. Traumatic œdema from the operation is speedily reduced by this method of treatment, which enables the child to be fitted quickly with a prosthesis.

## EXERCISE

Stump exercises, to re-educate the muscles, should be carried out with children as with adults.

A band of material is held loosely round the lower end of the stump whilst a cord from the band passes over a pulley or hook on a horizontal bar fixed about 6 in. away from the face of a wall. A weight is attached to the end of the cord, varying from 3 lb. to about 10 lb. according to age and physique of the patient. The child stands facing the wall holding some support and, by slowly moving the stump backwards and forwards, lifts and lowers the weight thereby exercising the extensors and flexors. The adductors and abductors are similarly exercised by the child standing sideways to the wall and again raising and lowering the weight.

Small weights are used in the early exercises which are carried out for a few minutes only. Both the weight and time are increased daily as indicated by the response to the treatment. Pain in the stump and fatigue generally must be avoided, being caused either by the weight being too heavy or the exercise too long. The cord from the band round the thigh and passing over the pulley should be horizontal to retain the band in place on the stump. All movements should be made by the stump from the hip-joint with the patient standing erect the whole time; no other musculature should be brought into the exercise. Below-knee amputees are given the same exercise for the thigh muscles, while the knee-joint is further treated by supervised flexor and extensor movements.

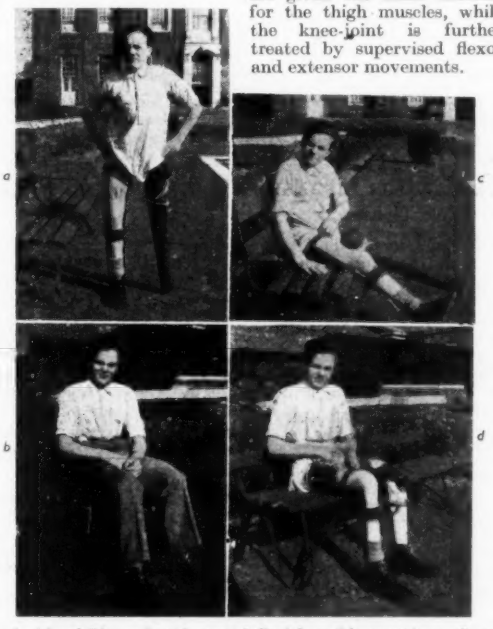



Fig. 6—(a) and (b) case 6, with congenitally deformed legs wearing appliances used since early childhood. (c) and (d) Wearing articulated appliances.

Fig. 4—Scoliosis (case 2).

Fig. 5—Scoliosis, and distortion of pelvis (case 3).

An effective manner of carrying out these exercises without any apparatus is to pass the cord carrying the weight from a band around the thigh over the lower rail of the back of an ordinary chair. A piece of roller bandage or a handkerchief will make a good band round the stump and a small flat iron or piece of stone forms the weight.

Amputees appear to walk more evenly and naturally if they are taught to support themselves first on the normal leg and then on the artificial leg without any other aid whatever. This balance on either leg is quickly gained by children, and full confidence is placed in the artificial limb.

When a child is allowed out of bed awaiting the supply of the prosthesis, crutches are provided. Many children do not have their crutches lengthened, replaced or adjusted in any way to allow for their growth. Using crutches which are too short causes them to stoop or arch the back. When only one artificial limb is supplied and worn, repairs will be necessary after a time, and while these are being done the child is left without a limb. The same crutches are used again, being relatively still shorter. Adjustable Wantage-type crutches, which will serve several years, are available at very little extra cost and should be given to all child amputees.

Children with congenitally deformed legs receive some attention, but those with congenital defects of the arm are usually neglected. They are able to use the deformed limb in a remarkable manner because they are so easily adaptable, but how much better it is to give them a good prosthesis which they can learn to use as they grow. A surgical operation may be necessary before a correct prosthesis can be fitted, but it is much better to get this over in childhood.

A child who has had an arm amputation should be given graduated exercises for the stump from the day after operation. Shoulder-joint movements must be encouraged at once, so as to retain the whole range of action. In below-elbow stumps the elbow-joint will inevitably be exercised if the shoulder-joint is given the main consideration.

While the fitting of the artificial arm is in progress, a temporary plaster socket, a crêpe bandage or even 'Elastoplast' can be applied to a forearm stump with wires or clips incorporated in the end for the attachment of a spoon, fork or pencil. This enables the patient to use his arm from the earliest days, and he does not rely on the stump and other hand and arm. This capacity to use temporary devices is specially manifest in double-arm amputees. A patient writes ably from the start with any improvisation fitted to the right forearm. Fig. 1 shows a temporary method of using a pencil held by a bandage. A temporary limb can be made from ordinary fracture bandages with a clip to hold a pen or pencil. The older practice of teaching such a patient to write or use his left hand in place of the right is being abandoned. All patients write well with a lower-arm prosthesis and many do so with an upper-arm limb. The normal left hand is an indispensable guide in clerical and manual work and one does not readily realise the

varied and complicated uses to which it is put by the ordinary right-handed person. A clerk holds the pen in the right hand; but he turns pages and uses the ruler and other instruments demanding full tactile sensitivity with the left hand. Similarly a mechanic holds small fitments in place with the left hand and any tool can be adapted to a right artificial arm to do the mechanical work required. To write with a left hand requires complete re-education of the brain which results in the disturbance of other brain centres. Many cases have been noted where a patient stammers in his speech whilst this left handed attempt is being made.

A recently returned prisoner of war from Germany lost his left arm in May, 1940, when it was amputated above the elbow. He was left-handed and not ambidexterous. In early life his left hand was strapped to his side in an endeavour to make him use the right hand. He is a man of average intelligence and from his story it seems he could not use the right hand for writing or any intricate work. After a while he was allowed to use the left hand and continued to do so until it was amputated. After the operation in 1940 he wanted to write home. The attempts, which I have seen, were crude; but during 3½ years in prison camp he persevered and his writing improved. He says it was very difficult, and that he could not speak without great strain while writing; and even when not writing he stammered. He also complained of feeling as if he was falling over while trying to write with the other hand. When he returned to England he was fitted with an artificial arm in January, 1944, and he is now writing as well with the left hand as with the "re-educated" right hand. His writing has the same characteristics and slope as before amputation, and his stammer has almost cleared up. He now has no sense of falling, being as he says on the "normal side of his work."

This sense of working the wrong way has been expressed by several amputees who have been asked to write with the other hand.

### CASE-HISTORIES

CASE 1.—A patient was born normal in April, 1887; he had infantile paralysis when 6 months old which left the right leg completely paralysed and flail. He was taught as a child to walk on crutches. Later in life he dispensed with the left crutch because he could not carry anything with both hands using crutches. The right leg impeded his walking and tripped him up, so it was held in the lower part of the right crutch. He walked and went to work in this manner until 1942 when his right arm became affected by crutch palsy. Resuming the use of a pair of crutches did not ameliorate the condition and gangrene of the right hand followed. Attempts to save the arm failed, and finally it was amputated above the elbow. He then fixed the right crutch over his shoulder, but it was difficult to walk. He was fitted with a strong artificial arm at Roehampton, having a detachable stick to replace the right crutch. At the same time amputation of the useless right leg was recommended. The patient agreed but some surgeons said it was not practicable. Eventually the leg was amputated leaving about 4 in. of the femur, and an artificial limb was fitted. He now walks without crutches or even a stick for the first time in his life at the age of 56. If this had been carried out as a child he would still have had both his arms. Fig. 2 (*a*) shows the man as he walked with the deformed leg and one crutch, and fig. 2 (*b*) shows him walking normally with his artificial limb.

CASE 2.—A girl was born with an embryonic foot at the end of the right lower leg, having no ankle-joint; and also with an embryonic hand (represented by some projections of soft tissue too small to show in the figure) at the lower end of the left humerus. Her right hand was also badly deformed (fig. 3). The leg was amputated above the knee at an ideal site and she was given a fibre full-length temporary limb to enable her to walk. There was no joint at the knee, so that any movement there was impossible, and as she grew few adjustments were made except replacement of the fibre limb at times. She could only sit down with the leg fully extended. She developed scoliosis (fig. 4). The deformed arm was never treated or fitted with an appliance. The girl is now nearly 16, and a proper prosthesis for the leg and for the arm have just been made.

CASE 3.—A girl fell out of a window at the age of 3; the injury necessitated an amputation, and later reamputation of the left femur, which was left with a very short stump. She was given only one crutch until the age of 7, when she was given an artificial limb. It had formerly been said that a child could not be fitted with a limb on such a short stump. She has now used the limb for a year and grown 2½ in. No adjustments beyond lengthening have been needed for the limb. Scoliosis and distortion of the pelvis are shown in fig. 5.

The following cases show the contrasting results to be expected when correct treatment has been given:—

CASE 4.—A boy had a fall when only 15 months old, fracturing the tibia and fibula of the right leg. Surgery failed to produce union of the bones, and 2 years later there was a space of over 2 in. between the ends of them. The lower part of the leg was amputated and the boy fitted with an artificial leg 3 years ago. He has been seen periodically and all adjustments necessary for growth have been made, with the result that there is no deformity and he joins in all activities of his friends, including football. He has refused even to take the limb off at night being afraid he would lose it.

CASE 5.—A girl had a sarcomatous growth of the right femur, and the hip-joint was disarticulated completely. She was fitted with an artificial limb and the necessary examinations and adjustments have been made. There are no secondary deposits and no deformities after 2 years. She recently attended a dance and took part in all dances during the whole evening.

CASE 6.—A boy with congenitally deformed legs has been fitted since early childhood with the appliances shown in fig. 6 (*a*) and (*b*) having no movement at the knee on either leg. He walked stiff-legged and sat with extended legs. No surgery was required to enable a pair of articulated appliances to be fitted, with which he can now walk and sit in comfort (fig. 6 (*c*) and (*d*)).

### SUMMARY

Children of school age and infants who suffer amputation may now be admitted to Ministry of Pensions hospitals for expert surgical treatment and be provided with the best possible artificial limbs through the organisation of the governors of Queen Mary's (Roehampton) Hospital in conjunction with government departments and local education and child-welfare authorities.

The site of amputation should be carefully chosen in children, expected growth being taken into account. The stump should be such that a normal prosthesis can be fitted instead of a temporary appliance which cannot be adjusted.

A child should be fitted as soon after operation as possible. As with adults, correct nursing, exercise of the amputated stump and bandaging are imperative.

Examples of delayed treatment and fitting are contrasted with some correctly treated cases.

I would like to thank the Director General, Medical and Executive Officers of the Ministry of Pensions for permission to publish information contained in this article.

## INFECTIOUS DISEASE IN ENGLAND AND WALES

### WEEK ENDED APRIL 29

*Notifications.*—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1764; whooping-cough, 2397; diphtheria, 628; paratyphoid, 4; typhoid, 9; measles (excluding rubella), 2055; pneumonia (primary or influenzal), 711; puerperal pyrexia, 164; cerebrospinal fever, 71; poliomyelitis, 9; polio-encephalitis, 2; encephalitis lethargica, 3; dysentery, 218; ophthalmia neonatorum, 80. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on April 26 was 1760. During the previous week the following cases were admitted: scarlet fever, 112; diphtheria, 48; measles, 66; whooping-cough, 68.

*Deaths.*—In 126 great towns there were no deaths from enteric fever, 2 (0) from scarlet fever, 2 (0) from measles, 16 (5) from whooping-cough, 5 (0) from diphtheria, 49 (12) from diarrhœa and enteritis under two years, and 7 (0) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 250 (corresponding to a rate of 31 per thousand total births), including 23 in London.

# In England Now

*A Running Commentary by Peripatetic Correspondents*

THE BBC commentator's announcement that two young Americans, Woodward and Doering, have synthesised quinine (goodness; if they have!) set me thinking in my bath about this business of "making "natural" drugs in the laboratory (my higher certificate was endorsed "not organic chemistry," but I did splendidly in Little-go). Aren't they starting at the wrong end? If you want to learn how to build a house you don't wait till the builder has finished it and then take it to pieces—you could probably deduce the process in this way but it would be simpler to watch him build it. So instead of starting with the finished product of the cinchona tree, or the penicillium mould or whatever it may be, the chemists ought surely to follow the plant's own steps in synthesis. Presumably the seed of the cinchona tree has no quinine in it; how about the first shoot? At what stage of the tree's growth can you first detect in it some compound that others haven't got? The same with penicillium. It is 14 days before the mould has made its full whack of penicillin; but what has it made by 7 days, or by 3, when there is a growth on the surface of the medium like the one we dread on jam? Somewhere between those days the mould converts the dull diet prescribed for it by Czapek and Dox into the near-cure-all we want. All we have to do is watch how it's done. It should be easy for a man with Little-go behind him, but I couldn't work out the details because the bath-water had got cold.

* * * *

The young lady deputising as temporary assistant medical registrar asked me to see a patient sent in two days previously with œdema of the feet which had subsided on recumbency. She had already ordered an X ray of the thorax, an electrocardiogram, a full blood-count, estimation of blood-urea and various renal-efficiency tests. And now she desired my opinion on the necessity of considering the plasma-proteins and circulation-time. She had failed to observe that the patient was an over-worked waiter with varicose veins. Then there was the very young house-physician who was worried over a grizzling child of 3 years whose mother had reported that he was weak on his legs. During the week-end she had performed a lumbar-puncture, had requested an X ray of the skull and spine, and a Wassermann reaction, and she was now endeavouring to persuade an irate, rather sceptical and intensely critical pathologist to investigate the vitamins in respect to possible deficiency. But she had not looked at the legs, let alone considered the child's capacity to walk. Next a considerably older lady doctor called me out in private on account of her agitated inability to explain a pyrexia of 48 hours' duration without physical signs. The portable X ray people had been put on the job to photograph the chest and the sinuses. The pathologist was doubtless rubbing his hands; for in addition to a nasal swab and specimens of urine and fæces for bacteriological examination he had been given an order for a full blood-count, a blood-culture and all the agglutination tests he could think of. I hinted that the whole of the Royal College of Physicians could do no more than guess at this stage; that fully 99% of such problems turned out to be febriculæ, feverish colds, or, to use a popular but generally incorrect phraseology, influenza; that she could conscientiously administer a diaphoretic and wait for another four or five days for the temperature to subside or an explanatory rash or physical signs to present themselves. She telephoned me three days later to say the patient's temperature was normal.

All this happened in a week. It is a coincidence that the actors were all of the gentler sex. I hasten to record this to forestall any accusation of misogyny, a charge which to an avowed feminist would be unjust and distressing. Moreover the next experience showed that a mere male can in uncritical clinical application easily eclipse his fair colleagues. A pallid, wasted, elderly gentleman had suffered with intestinal symptoms for nearly 6 months. He brought a large bundle of documents which included 12 reports on elaborate examinations of his fæces and 8 on his blood, comprising every possible investigation. There was much in these of the Arneth count, as it shifted more or less to the left on occasion. At times, the hæmoglobin, which was on the average 65%, rose by 1 or 2%, an improvement regarded as worthy of congratulation. The sedimentation-rate was carefully scrutinised, and, although invariably considerably accelerated, exhibited minor variations interpreted as of great consequence. The work on the urine was monumental, comprising every sort of investigation of which I had ever heard and not a few of which I had not.

The opinion was that we were confronted with an atypical infection by an anaerobic streptococcus for which "intestinal antiseptics" had proved disappointingly inadequate. I gathered that no examination of the abdomen had been made for at least three months. A large tumour was palpable there, and a surgical colleague who explored the abdomen next morning exposed a cyst of the sigmoid containing a huge quantity of stinking material.

The moral is that we do not teach medicine properly, and that although the tendency in all the somewhat flatulent schemes for the medical student's future seems to be in the direction of further elaboration, it would be far better if those in high authority would be bold enough and powerful enough to bring about a simplification with a return to first principles. Above all, the danger must be avoided of entrusting elementary education to the bright young people of the "registrar class." The old buffers may not appear to be very knowledgeable about the latest advances and the application of this, that or the other new gadget, although they often know a good deal more than they are credited with knowing. But length of experience and maturity are needed for a sense of proportion; and those of us whose usefulness is approaching its end regard with some alarm the type of average doctor that the future is likely to produce. After 30 years of consulting practice, 20 in the outpatient department and 10 in the wards, I would give much for a few weeks with a good old GP who knew his physical signs and understood human beings.

* * *

"Positive health," eh? I wonder what the coiner of the blessed phrase had in mind? Health itself is hard enough to define and the maintenance of good health appears to be a precarious feat of balancing, only to a very limited extent under the control of either patient or doctor. Clearly a man may make himself ill by riotous living, but the most blameless and temperate way of life is no guarantee of reasonable, much less of positive, health. These prophylactologists of the future are going to have a job which I for one do not envy them. "Tell me, Doctor, how can I avoid getting colds, diabetes, Bright's disease, osteo-arthritis and disseminated sclerosis?"—these are a fair sample of the simpler posers by answering which they will earn their daily bread.

* * *

Of the rocks on which our mess is founded Captain Bulger, RAMC, is the firmest. He's as fit as a fiddle (he can drink 15 pints without turning a hair), and always smartly turned out. His brasses would shame a heliographer, and his badges of rank, officer's, cloth, are white as snow with Chinese ink (it was said he refused a majority because a crown is smaller than three pips). And withal he's a great upholder of preventive medicine —"Health, sir, is just a matter of discipline. Put everyone in the Army and I'll see that they arn't sick." It came as a shock to him the other day to find that discipline does not mean the stiff upper lip to everyone. It was at our local, where, as a magnificent gesture, he was drinking with an American captain. In rushes the visitor's driver, yelling, "Gee, cap'n, can me and Hank take two dames out for a ride in the jeep?" "Sure boys, go ahead," he says. Then, turning proudly to Bulger, "Now that's what I call discipline. Those lads needn't have asked. They could just have taken it."

* * *

Today I was told that "Owing to difficulties of printing at the present time there are no more special forms for measles and whooping-cough notifications, and we are to use the general notification forms instead." So the ill wind of war has blown away one certificate; dare we hope that others will follow?

# Parliament

## ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE House has not heard the last of Service pay and allowances. Allowances for children of those in the Services have been increased to 12*s.* 6*d.* a week, but allowances for the same children on the death of their parent in the forces go down to 11*s.* a week. Pointed attention was called to this difference at question-time by six Conservative and two Labour members who asked for reconsideration. Mr. Attlee's reply, as deputy Prime Minister, was "No, Sir," and the House is not satisfied. Sir Archibald Southby said that "in view of impending operations" he would not raise the matter on the adjournment but reserved the right to raise it at a later date. There will have to be another debate on the subject.

The mood of the House is dominated by the "impending operations," and the presence of Brigadier Maclean on leave from Yugo-Slavia, where he is serving at Marshal Tito's headquarters, attracted more notice than some of the debates. Indeed there is more stirring behind the formal sessions than at those sessions themselves. At the Medical Parliamentary Group, Prof. A. V. Hill, lately returned from a visit to India, gave an account of the conditions in that sub-continent and mentioned the projected improvement of medical and allied services there. Lord Wavell, the philosopher-soldier viceroy of India, takes an especial interest in health and places the subject high on the list of priorities. We shall no doubt be faced at the end of this war with vast problems of nutrition, hygiene and epidemiology in Europe and in the East, but we shall be helped, as we were not after the last war, by a great amount of knowledge collected during the war.

By the time these words are printed the House will probably have passed the Education Bill. Mr. Butler is expected to deal more fully than he has already done with the problem of the integration of the school medical service with the proposed national health service. But during the last week two more white-papers on education have been produced—the McNair report on *Teachers and Youth Leaders*, and *Principles of Government in Maintained Secondary Schools* (Cmd. 6523, 2*d.*). The first has 176 pages, the second only 10, but it is difficult to see how any ordinary hardworking MP can consume and digest so much white paper in the time at his disposal. The danger of overwhelming parliamentary procedure by wave upon wave of white-papers is real and calls for some scientific planning of the time of debates as well as modifications of the work of Parliament itself. The only way out, if we are to maintain democratic control over legislation, is to refer a great deal of work to standing committees. Reports by outside authorities, like the McNair report, and white-papers produced from the ministries themselves require keen parliamentary scrutiny.

The white-paper method of business is further exemplified this week by the debate on a national system of water-supplies, which has been followed at once by the presentation of the Rural Water Supplies and Sewerage Bill. The House gave this a cold reception. The proposals reeked of the parish pump and were not inspired by any hope of a comprehensive national plan. The Government's proposal to transfer inspections of the cleanliness of milk from local authorities to the Ministry of Health was also criticised as autocratic. The via media will not be found until we return to the normal method of parliamentary government shared between a party government and a party opposition. But that is unlikely to happen before Germany is defeated. Meanwhile the Beveridge white-paper or papers are expected, and the Goodenough report should be out soon.

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REHABILITATION FILMS.—Mr. BEVIN stated that in consultation with his department, Dame Georgiana Buller had recently initiated the making of a film demonstrating the training of disabled persons, and copies were now available at the Central Film Library. The Ministry of Information had also in preparation a film for general distribution on the rehabilitation of the limbless.

## FROM THE PRESS GALLERY

### "Our Sister Water"

IN the House of Commons on May 3, the Minister of Health moved a resolution welcoming the intention of the Government declared in the recent white-paper to introduce measures for the conservation and better utilisation of the country's water resources, the improvement of the administration of the water-supply, the further extension of public water supplies and sewerage in rural localities, and the better management of rivers.

The Government's objectives, said Mr. WILLINK, must be to secure that all reasonable needs for water should be met. Considerable changes would be necessary, but large parts of the present organisation were working well and there was no reason to make a complete change in its nature. He laid down three principles for acceptance: first, a greater degree of central control over development; second, ultimate responsibility for the efficiency and vigour of our water-supply administration, with the Minister of Health and Secretary of State for Scotland directly responsible to Parliament, and with local authorities responsible to their electorate; and third, sectional interests must be set aside if the national interest required it. Statutory undertakings must accept further regulation of their business where necessary, but should have full opportunity of putting their case to the minister. There was ample water in the country for all needs, even allowing for greatly increased demand. What was needed was equitable and wise distribution. The Government would press on with the Inland Water Survey at the earliest possible date. A bill would be introduced this session to provide for substantial exchequer assistance for the extension of rural water-supplies and sewerage. About 30% of the rural population of England and Wales had no piped supplies of water to their houses, or within reach. That represented about 5% of the general population, or roughly 2 million people. The Government's contribution for England and Wales would be £15 million. The programme could not be put into operation at this moment, but the Government regarded it as an essential part of the general reconstruction programme, and plans would be made before the end of the war. It would be wrong at the moment to talk of a crisis in water-supply. But the country had suffered from three consecutive dry winters, and the winter just past was quite embarrassingly dry. The Ministry of Health possessed adequate powers to deal with the situation. The supplies in the towns were not in difficulty at present, and the Metropolitan Water Board has not asked for any emergency steps to be taken. In conclusion, Mr. Willink reminded his listeners of the words of St. Francis of Assisi in praise of "our sister water, who is very serviceable unto us, and humble and precious and clean."

Mr. ALEXANDER WALKDEN was disappointed in the white-paper and in the minister's speech. It had been hoped, he said, that a strong water policy would accompany the health service, but those who had compiled the white-paper on water-supplies seemed to be too fearful of difficulties and too tender to existing interests. The Lincoln and Croydon epidemics resulting from poisoned water-supplies must not be allowed to recur. Mr. G. MANDER supported the white-paper as far as it went, but did not think it went far enough. He could not believe that £15 million would be sufficient to supply all the rural areas with the water they needed. He thought it would be going too far to have a minister of water as proposed by the British Waterworks Association, but he saw no reason why we should not have a specific water department at the Ministry of Health. Mr. S. J. PETERS wanted a national board with powers over water, electricity and all matters of utility.

Mr. R. HUDSON, who summed up, said that water was not, like electricity, something that could be treated by itself. You could not divorce water from such things as housing, health and drainage which were all the intimate concern of the Ministry of Health. Accordingly the Government wished to provide the Minister of Health with full powers for central direction and control and above all power to see that the various authorities carried out the responsibility which, the Government hoped, Parliament would agree to their shouldering.

## QUESTION TIME

### Distribution of Penicillin

The Lord President of the Council, replying to a question, said the Penicillin Clinical Trials Committee appointed by the Medical Research Council is responsible for the distribution only of the part of the penicillin supply which is allocated for research in this country; the remaining and larger part is going to the forces overseas. The total quantity distributed by the committee up to the end of March 1944 was about 500 million units, of which about 420 million units were divided between the hospitals in Oxford, London and Edinburgh chosen as the main centres for clinical trial. The committee has also provided smaller supplies for specific clinical purposes to fourteen other centres in this country, and sixteen further projects for particular forms of study were approved at a recent meeting. The aim of these clinical trials is to treat cases under controlled conditions in order to determine the value of penicillin in different diseases and the best methods of its use. No proposal for any promising investigation has been rejected owing to shortage of supply. In some of the institutions work has not been in progress for long enough to justify publication of results, but several reports have been issued and others are in prospect.

### Workmen's Compensation for Health Workers

Dr. H. B. MORGAN asked the Minister of Health (1) whether, in planning for the new National Health Service, he had considered the advisability of taking steps for workmen's compensation for health workers exposed to infectious diseases and ailments in the course of, and resulting from, their occupation; whether he was aware that up to the present this risk had not been recognised statutorily for health workers on the lines of the scheduled diseases associated with industrial processes or exposures; and (2) whether, at any time since the scheduling of certain diseases after inquiry under the workmen's compensation legislation, his department had submitted a request to the special Home Office Workmen's Compensation Committee dealing with the scheduling of industrial diseases for the scheduling of pulmonary tuberculosis as an occupational health risk in sanatoria and other institutions, having regard to the risks run in dealing with such an infective disease as tuberculosis; and if not, why not.—Miss F. HORSBRUGH, Parliamentary Secretary to the Ministry of Health, replied: The scheduling of diseases under the Workmen's Compensation Act is a matter for the Home Secretary, but I understand that the principle always followed is that diseases to be scheduled must be so specific to the particular employment that their causation by that employment can be established in individual cases. This could not be applied to the ordinary infectious disease or tuberculosis. I do not think that the National Health Service proposals affect the principle involved.

### Advice for Expectant Mothers

Mrs. J. ADAMSON asked the Minister of Food whether, under the scheme for the distribution of food and clothing coupons to expectant mothers, he would authorise his food officers to notify the health department of the local authority with particulars of applicants and thus facilitate contacts with health visitors for advice.—Colonel J. LLEWELLIN replied: The suggestion has already been carefully considered and I have been advised that a considerable proportion of women would object if information which they gave to the food office were divulged to anyone.—Mrs. ADAMSON: Does the Minister not realise that if this procedure were carried out it would remove the grievances and opposition of the local authorities and would be in the interests of expectant mothers?—Colonel LLEWELLIN: Before these women come to the food offices for their special priority issues they require to have a medical certificate and that seems to be the appropriate time to give them advice as to what to do for medical purposes.

### Diphtheria Immunisation in Scotland

Mr. J. JOHNSTON, replying to a question, said that the numbers of immunisations against diphtheria recorded in Scotland during 1941–43 are as follows:

| | *Under 5* | *5 to 15* | *Total* |
|---|---|---|---|
| 1941 .. | 153,913 .. | 464,792 .. | 618,705 |
| 1942 .. | 57,690 .. | 71,892 .. | 129,582 |
| 1943 .. | 29,826 .. | 16,060 .. | 45,886 |

The following table shows the incidence among immunised and non-immunised people in the second half of 1943:

| | *Non-immunised* | | *Immunised* | |
|---|---|---|---|---|
| | *Cases* | *Deaths* | *Cases* | *Deaths* |
| Children up to 15 .. | 1599 .. | 85 .. | 756 .. | 5 |
| Persons over 15 .. | 922 .. | 15 .. | 69 .. | 0 |

INCREASE IN SCOTTISH UNIVERSITY FEES.—Mr. JOHNSTON said he had seen press reports of the decision of the four Scottish university courts to increase university fees in all faculties except that of medicine.

NUMBER OF MENTAL PATIENTS.—Mr. WILLINK gave the total number of certified patients in mental hospitals in England and Wales on Dec. 31, 1943 as 115,313. Their percentage to the total estimated population at the middle of 1939 was 0·28. The number of certified patients readmitted into mental hospitals in England and Wales in 1943 was 3904, representing 3·4% of the total certified patients.

DOMESTIC WORKERS.—Mr. MCCORQUODALE said that the priority of domestic employment in hospitals was placed on the highest level and was regarded by the Ministry of Labour as equal in importance to aircraft work.

## Obituary

### WILLIAM TURNER

M S LOND, F R C S

FROM the time William Turner came to Westminster Hospital, now nearly fifty years ago, he made it his chosen sphere of work; when he retired in 1934 the hospital in turn chose him as one of its vice-presidents, and it was there that he died on April 30 in his 74th year. Son of Frederic Turner of Hildenborough, Kent, he went to King's College School and thence to KCH where he was one of Lister's pupils and gold medallist of his year. After graduating MB in 1895 he stayed at King's as demonstrator in anatomy and surgical registrar until his appointment in 1897 as assistant surgeon to the Westminster. Meanwhile he had served on the MAB smallpox ships. The South African War interrupted his career briefly and he served as surgeon to the Imperial Yeomanry Base Hospital at Deelfontein and later was in charge of the branch hospital at McKenzie's Farm. He returned to London where besides his hospital work at the Westminster and the claims of a growing practice he found time to act as consulting surgeon at King Edward's Hospital, Ealing, the Dreadnought Hospital, Greenwich, and the Royal Hospital for Diseases of the Chest. During the war of 1914–18 he gave generously of his time and experience to the 4th London General Hospital, the King George Hospital, the American Red Cross Hospital No. 22 and Mrs. Mitchison's Hospital in Chelsea. Surgery was his all-absorbing interest but this busy life left him little time for writing, apart from notes on orthopædic technique, and a practical guide to *Treatment after Operation* (1912) with Rock Carling. Patients valued his thoroughness and consideration for their welfare, students his sound and clear teaching, and colleagues his ready counsel and help. One of them adds "Westminster will miss 'Billy' Turner and his shrewd advice and balanced judgment in the many committees on which he was a faithful attendant." He leaves his widow, née Lily Hamilton of Tavistock, with one son, Dr. C. F. Hamilton-Turner, now serving overseas with the RAF.

THE death is announced during March while on active service of Lieut.-Colonel LIONEL AUGUSTINE JOSEPH GRAHAM, LMSSA, RAMC. He was born in 1887 and educated at Cambridge and Guy's Hospital. Immediately on qualifying in 1915 he took a temporary commission in the RAMC, and was with the Egyptian Expeditionary Force till the end of the war. In 1919 he joined the regular establishment of the RAMC and was promoted major in 1927. He had served in Singapore and in India, where his prowess in tennis and golf will be remembered. At the beginning of this war he was one of the first medical officers to be sent to France and since 1940 he had been in the Middle East. He leaves his widow with two sons and a daughter.

# Letters to the Editor

## COST OF A NATIONAL HEALTH SERVICE

SIR,—Dr. Robb-Smith's article in your issue of April 22 is impressive as an argument for estimating the eventual cost of the white-paper scheme at a figure considerably higher than is indicated in appendix E. The Ministry of Health can I think fairly be criticised on the ground that they have made no attempt to warn us of the final cost to the country. What they have done, however, is to estimate for the incomplete scheme which will have to suffice us for the first two or three years. In that period there will be insufficient doctors, consultants, hospitals and clinics; there will probably be no health centres, or very few; and no new building for the new service is likely for two years after a European Armistice. What precise deductions are made in the white-paper under these heads I would not venture to guess, but it does seem possible that the Ministry of Health's figures are not far out. The crime which Dr. Robb-Smith should allege against the authorities is not, that they are parsimonious, but that they do not promise to conjure up all the desired resources in a devastated world at the outset.

Moreover the shortage of these resources is no valid argument for postponement. It makes it all the more necessary that they should be used to the best advantage for the whole population.

London, W.11. RONALD DAVISON.

## SULPHONAMIDE DERMATITIS

SIR,—Having seen well over 400 cases of skin eruptions due to sulphonamides during the last 12 months in Algeria and in the CMF, 300 of them being of the light-sensitisation type, I feel that the letters of Evans (Jan. 29) and Colebrook (Feb. 5) call for comment. Evans remarks that nicotinic acid seems the obvious remedy. I only wish that this were true—nicotinic acid had no effect whatsoever in 20 cases in which I used it (though never intravenously), but huge doses of vitamin-B complex seem to be of some help. Certainly, the cases of sulphonamide light-sensitisation with the dermatitis on the exposed areas and the scrotum, the cheilitis and glossitis, resemble but do not give the same clinical picture as pellagra. The comparison between the two syndromes is noted and discussed in a paper which I hope will be published in the near future. Just as many cases have been seen in winter as in summer, and it should be noted that the sun has been conspicuous by its absence in the Central Mediterranean theatre of war. Colebrook's experience of more than 2000 cases of burns treated by the local application of sulphonamides is impressive, but during the last four weeks I have seen 4 cases of light-eruption due to burns treated in this way. It is true that, as was stated in a short paper (Peterkin, G. A. G. and Jones, E. C., Impetigo contagiosa in the Services, with special reference to its treatment with sulphathiazole: *Brit. med. J.* March 13, 1943, p. 318), these reactions are much less liable to occur if the drug is applied in a thick paste (such as Lassars) or a water-miscible cream, but they do occur, and there is little doubt that patients who may heal well and show no reaction to sulphonamide treatment may, by that treatment, be sensitised to the sulphonamide series when they are used on another occasion.

G. A. G. PETERKIN.

## HAZARDS IN THE TREATMENT OF VARICOSE VEINS

SIR,—I can fully endorse the remarks of Surgeon Commander Oldham in his letter of April 15 (p. 516). He draws attention to certain prerequisites for success, such as careful preparation of the part, general anæsthesia, strict aseptic and hæmostatic technique, the use of cannula rather than needle, the swabbing away of any fluid spilt, accurate suturing of the skin edges of the inguinal incision, and finally the application of a firm gauze pad and 'Elastoplast' dressing. My experience bears this out. I doubly ligate the proximal end of the saphena vein with silk, support the limb from foot to groin with an 'Elastocrepe' bandage, and get the patient up as soon as he recovers from the anæsthetic; the sutures remain in for a week or ten days. For ordinary injections I have tried various sclerosing solutions such as quinine-urethane, sodium salicylate, lithium salicylate, and 5% or 10% sodium morrhuate. Since April, 1938, I have used monoethanolamine oleate ('Ethamolin'), almost exclusively, both for the injections and the combined ligature and injection operation. This chemical was first recommended by H. I. Beigeleisen of New York (*Ann. Surg.* 1937, **105**, 610). Its sclerosing powers are good; only now and then is thrombosis not produced. It appears to be relatively non-toxic; there have been no instances of anaphylaxis, embolism, deep thrombosis or puncture necrosis. It is not my intention to give the impression that all cases respond to this treatment or that there are no recurrences, but merely to reaffirm that in a long series of cases treated by this method there have been no immediate untoward complications—as Mr. Oldham says, with reasonable care, the hazards are minimal.

St. Andrew's Hospital, Bow. J. R. M. WHIGHAM.

## THE MANTOUX TEST

SIR,—I have just seen the annotation on tuberculosis in the young child (*Lancet*, April 1, p. 442), and although it is rather late I must protest at the misreporting of what I said at the meeting. My main theme was the extreme value of the Mantoux test in young children and I favoured its routine use in all infants under the age of two years. In fairness I pointed out that it had certain limitations which I described in detail. But the "16 out of 63 children" with tuberculosis who gave negative tests were not my cases: they were quoted from a paper by M. I. Levine (*Amer. J. Dis. Child.* 1939, **58**, 799), and they all reacted positively at subsequent tests—a point ignored in your annotation. (They were, anyway, a special series of infants, 70% of whom were under four months of age.) I have myself never seen a proven case of tuberculosis in childhood—except in moribund children—which did not give a positive Mantoux. The substance of my paper, put in one sentence, was "Clinical examination and X-rays are of very limited value in the diagnosis of early tuberculosis in children; the diagnosis stands or falls by the result of the Mantoux test." It would be unfair to the British Pædiatric Association, on whose behalf I was addressing the Tuberculosis Association, to let it be thought that pædiatricians in general had such a poor opinion of the Mantoux test as the reader of your annotation might infer.

Warwick. WILFRID F. GAISFORD.

## STANDARD TUMOURS AND CHEMOTHERAPY

SIR,—Your leading article of April 29 (p. 569) reviews the 41st annual report of the Imperial Cancer Research Fund and emphasises the discovery of "a new method for standardising test tumours. It consists essentially in causing a primary growth in a member of an inbred pure line strain of mice and then transplanting it into others of the same strain. The grafted cells are not foreign to the host; they may be assumed to be antigenically and genetically identical with the host's cells; the grafts always take, and if doses are equal grow at the same rate in all the mice. When the even rate of increase of these transplants is contrasted with the variable rate of spontaneous tumours, the advantages of standardisation become clear."

In this Institute in 1937 tumours were induced in a pure line of mice—namely, with methylcholanthrene in the CBA strain, by E. Boyland and F. L. Warren ("The Induction of Tumours by Methylcholanthrene in Two Strains of Mice." *J. Path. Bact.* 1937, **45**, 171). Subsequently Dr. Boyland produced another such tumour (Sarcoma MCDB induced by injection sub cutem of methylcholanthrene in a male mouse of the pure Dilute Brown strain) expressly for use in therapeutic tests, and used it for this purpose until his investigations were interrupted by the claims of work connected with the war in 1940 ("Experiments on the Chemotherapy of Cancer." Parts III, IV and V. *Biochem. J.* 1939, **33**, 618, 1940, **34**, 1196, 1941, **35**, 1283). In the first of these papers (p. 619) Dr. Boyland stated very clearly the advantages now claimed in your leader for the method alleged to be new, and compared the characters of the new tumour with those of the Crocker sarcoma. Dr. Boyland says, of the sarcoma MCDB, "The

tumour has always been grafted into mice of the same strain, in which it grows readily and regularly: it is now in the eighth grafted generation. A tumour of this type, which has never grown outside the same pure line of mice, resembles spontaneous or induced tumours in that genetic differences between the tumour tissue and the host's tissues are probably unimportant. In the case of the Crocker sarcoma inhibition of growth on treatment may be due either to (1) increase in resistance of the host to a foreign tissue or (2) damage to the tumour tissue per se. In the case of the MCDB tumour the factor (1) should not operate. This latter tumour has some advantages over spontaneous tumours—viz., (*a*) it is more easily available in large numbers, (*b*) tumours in different mice grow at the same uniform rate so that some mice may be used as controls, (*c*) the chemical constituents and biochemical reactions are probably more constant."

Chester Beatty Research Institute, Royal Cancer Hospital (Free). E. L. KENNAWAY.

*** We are glad of this reminder of Dr. Boyland's valuable work. We should make it clear that in his report Professor Gye did not state that the method was new. "The difficulties of testing cancer cures," he wrote, "are now met by using transplanted tumours in a pure line strain of mice."—ED. L.

## CECIL ROWNTREE MEMORIAL

SIR,—We are proposing to establish a medical and surgical reference library at the Queen Victoria Hospital to perpetuate the memory of the late Mr. Cecil Rowntree, FRCS, who was surgeon to this hospital for upwards of twenty-five years. His colleagues and his many friends and patients in and around East Grinstead remember him with respect for his skill and with gratitude for his many kindnesses, and it is felt that there could be no better permanent memorial to his name than such a library. Gifts of books or the means for purchasing them will be gratefully received and acknowledged by the secretary-superintendent of the hospital.

Queen Victoria Hospital, East Grinstead. A. C. SOMMERVILLE, Hon. Secretary, Medical Committee.

## "THIS MILK BUSINESS"

SIR,—A review of my book in your issue of March 18 says that the author "omits undulant fever, and mentions tuberculosis without giving . . . the amount of human infection of bovine origin." This statement evidences misapprehension on the part of your reviewer. For instance in the chapter on Infection and Contamination it is said: "But even if the cow's udder and flanks are regularly washed and the milker has assimilated all the eduction there is still the risk of drops of water or particles of dust falling into the pail. . . . It is well established that the bacteria of undulant fever survive in dry dust for many months." Then on page 68 you would find: "Some 6000 persons are killed on the roads every year in Gt. Britain. There is much public anxiety, and some agitation in consequence. And yet there is little anxiety and less agitation about the deaths from bovine tuberculosis. About 2000 deaths a year in Great Britain are due to this disease. And this disease is carried by unsafe milk." Also on page 97, after discussing the possibility of eradicating tuberculosis, it is asked how 1,300,000,000 gallons of milk could be provided from non-tuberculous herds; it is stated that "infection is being grappled with a large measure of success" and that "faithful adherence to the principle and practices evolved . . . will save uncountable thousands from crippled life and untimely death."

As your note on the book has given rise to serious misgivings I should be grateful for the publication of this correction.

Thame. ARTHUR G. ENOCK.

*** Mr. Enock's aim is to rectify the lack of knowledge on the part of the milk-consumer. His experience as consulting engineer has qualified him to write with authority on the technical aspects of milk control and distribution. But on the public health side the book is disappointing. Evidence of dangers to health is available in detailed reports of great importance on which Mr. Enock does not touch.—ED. L.

# Notes and News

## THE STUDENT'S HEALTH

FOUR student bodies have collaborated in a pamphlet on *Health and the Student*[1]—the National Union of Students, the British Medical Students Association, the British Dental Students Association, and the Scottish National Union of Students. It sets out an ideal scheme for the care of students under which they would be medically examined on entry to the university, and subsequently at intervals, by a full-time university medical officer, who would also give lectures—presumably on the care of health, though it does not say so. X-ray examination of the chest should be made on admission and at six-monthly intervals; and it is suggested that there should be a biennial Mantoux test, though repetition would presumably be unnecessary for those giving a positive result. Regular dental inspection is advocated. In considering the mental health of students much emphasis is laid on the dangers of a narrow scholastic outlook. The demand for cheap lodgings or hostels and good food deserves the early attention of university authorities.

As an immediate measure the pamphlet suggests that good use should be made of existing playing fields; and that where these are scarce they should be shared by university students and other groups of young people, such as youth clubs and local sports clubs, irrespective of ownership. It is felt that even if shortage of doctors at present renders regular medical inspection of all students impossible, arrangements should be made for the regular examination of medical and dental students who are exposed to more infection than their contemporaries taking other subjects. A section on health education foresees a health drive, with films, posters and exhibitions, and a series of lectures on health given by various authorities as part of the university course.

The cost of protecting the student's health, it is thought, would be covered by a comprehensive insurance scheme such as that put forward in the Beveridge report; but the standard of care outlined here exceeds that imagined by planners for the populace at large and would presumably be more costly. Two existing student insurance schemes, set out in an appendix, have relatively high premiums and cover treatment in case of illness rather than prevention of ill health by regular supervision.

A second appendix records the facilities for medical supervision at present offered to students in some English and Welsh universities and colleges. A full-time university medical officer has been appointed at Birmingham, but elsewhere arrangements are scanty or absent. This useful summary of current facts gives weight to the whole pamphlet.

### University of Oxford

In a convocation held on April 27, the degrees of BM, B Ch were conferred on M. F. C. Walker, and in absence, on S. E. M. Bates.

### Royal College of Surgeons of England

On Monday, May 15, and Wednesday, May 17, at 4 PM, at the College, Lincoln's Inn Fields, London, W.C.2, Prof. John Beattie will speak on clinical aspects of methionine metabolism. At the same hour on Friday, May 19, Surgeon Rear-Admiral G. Gordon-Taylor will give a Hunterian lecture entitled Second Thoughts on the Abdominal Surgery of Total War—a review of 1000 cases.

### Royal College of Obstetricians and Gynæcologists

At a meeting held on April 29, with Mr. Eardley Holland, the president, in the chair, the honorary fellowship was conferred on Sir Joseph Barcroft, FRS, and Dr. E. Hastings Tweedy, and the following were admitted to the fellowship:

J. B. Blaikley, D. W. Currie, J. V. O'Sullivan, J. H. Peel and (in absentia) H. I. McClure and A. W. Spain.

The following were admitted to the membership:

Jean R. C. Burton-Brown, Agnes E. D. Cathcart, Audrey I. Freeth, David Friedlander, M. M. Garrey, Eileen D. M. Wilson and (in absentia) A. P. Bentall and J. J. Kearney.

At the annual general meeting of the college held afterwards the following were elected to council in place of those retiring:

Representatives of the fellows: John Hewitt, John Eric Stacey and James Montagu Wyatt.

Representatives of the members: James Bruce Dewar and John Arthur Stallworthy.

1. Copies may be obtained from the secretaries of these bodies. 4*d*.

### Ministry of Health

Dr. J. A. Charles has been appointed second deputy to the chief medical officer of the ministry and will take up his duties on May 15.

Dr. Charles, who is a member of a family well known in medical circles in the north of England, is 50 years of age. He received his medical education at the medical school of Newcastle and after graduating with first-class honours at Durham in 1916 he saw service in the RAMC. He then returned to take the DPH at Cambridge and the membership of the Royal College of Physicians from the London Hospital. He acted as assistant tuberculosis officer at the City Infectious Diseases Hospital, Newcastle-on-Tyne, before he entered the public health service as assistant MOH for Wilts. He returned to Newcastle as deputy MOH in 1928 and succeeded Prof. Harold Kerr as MOH in 1932. He is in charge of the department of public health at King's College and has been examiner in his specialty for the Universities of Edinburgh, Leeds and Sheffield. His published work includes accounts of bacillary dysentery in Great Britain (1931); investigations into the health and nutrition of children (1933) and into the diets of working-class families in Newcastle (1935). He was elected FRCP in 1935. Of recent years he has devoted much time to the work of hospital and health services coördination both in Newcastle and in the North of England. He is at present a member of the social and preventive medicine committee and the pædiatric committee of the Royal College of Physicians.

### Royal College of Physicians of Edinburgh

At a meeting held on Tuesday, May 2, with Dr. A. Fergus Hewat, the president, in the chair, Dr. R. E. Verney (Edinburgh) took his seat as a fellow. Dr. T. McLaren Galloway (Carlisle), Dr. W. D. Henderson (Woking, Surrey) and Dr. H. P. Tait (Edinburgh) were elected to the fellowship.

### Medical Society of London

At 5 PM on Wednesdays, May 17 and 24, Prof. Henry Cohen will deliver the Lettsomian lectures to the society at 11, Chandos Street, W.1. His subject is to be the mechanism of visceral pain.

### Institute of Public Administration

The Haldane medal has been awarded to Dr. A. E. Martin, assistant MOH for Leicestershire and MOH for the Wigston and Oadby urban districts, for an essay on child neglect—a problem of social administration.

### Faculty of Radiology

On Saturday, May 20, at 11 AM, at the Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.2, Dr. A. H. T. Robb-Smith will deliver the Skinner lecture. He will speak on the natural history of disorders of the reticular tissue.

### British Institute of Radiology

On Friday, May 19, at 2.30 PM, there will be a meeting of medical members, and at 4.30 PM Mr. H. S. Souttar will deliver the Mackenzie Davidson lecture. He will speak on team work in the treatment of cancer.

On Saturday, May 20, at 3.15 PM, Prof. Sydney Russ, D SC, will give the Silvanus Thompson lecture on "The Man, Silvanus Thompson."

### Royal Society of Medicine

The following have been elected to the honorary fellowship:

Prof. E. D. Adrian, OM, FRS, Sir Farquhar Buzzard, Sir Walter Langdon-Brown (Great Britain); General Paul Hawley, Colonel J. C. Kimbrough, Colonel Elliott Cutler, Prof. E. B. Krumbhaar and Dr. D. P. O'Brien (USA); Sir Ali Ibrahim Pacha, FRS (Egypt), Médecin Général Inspecteur Adolphe Sicé (France), and Colonel Johan Holst (Norway).

At a meeting of the section of obstetrics and gynæcology on Friday, May 19, at 5 PM, Dr. E. F. Scowen will speak on the metabolism and therapeutic use of progesterone.

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SYNTHETIC QUININE.—The Polaroid Corporation, of Cambridge, Mass., announce that a method of synthesising quinine has been devised by two organic chemists: Robert B. Woodward of Harvard and William E. Doering of Columbia University, New York. It is by no means certain that the synthetic drug can be manufactured on a large scale during the war.

STANDARD CATGUT.—Referring to the last sentence of our annotation of April 29, Messrs. Allen and Hanburys Ltd. point out that "non-boilable" catgut is not of necessity chemically sterilised. Both boilable tubes and non-boilable tubes may contain a heat-sterilised product; only the method of presentation and tubing fluid is different. On the other hand, a chemically sterilised catgut is always issued in non-boilable tubes. It would be regrettable if the inference was drawn from our statement that a heat-sterilised catgut is in any way inferior to a chemically sterilised product.

### Preventive Medicine at War

Speaking as the guest of the Society of Medical Officers of Health at a luncheon held on May 5, Mr. H. WILLINK congratulated his hosts on the new low records for maternal and infant mortality which had been set up during the war, and at a time when the birth-rate had been steadily rising. Maternal mortality had fallen from 2·47 per 1000 births in 1942 to 2·29 in 1943 and it was likely that the final figure for infant mortality last year would for the first time be under 50 per 1000 births. The number of stillbirths in the first quarter of this year had also fallen to 29 per 1000 births, compared with 33 for the same quarter last year and 39 in 1940. The fall in the deaths from diphtheria marked the growing success of the campaign for immunisation. On the other hand as in the last war tuberculosis and venereal diseases presented major problems, and the increased incidence of venereal disease would demand special efforts from the public health service.

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IT is good news that the York Clinic for Psychological Medicine at Guy's Hospital, after serving some of the general needs of the hospital since the blitz of 1940–41, has now been opened for its original purpose. Of the 43 beds 30 have been allocated by the EMS for psychiatric casualties among serving officers, the remainder are available for civilians. This is the first complete psychiatric unit to be built in this country as an integral part of a teaching hospital. The acting medical director is Dr. Felix Brown, who has associations with the Maudsley and Johns Hopkins, and the sister-in-charge is Miss E. Purcell.

Prof. C.-E. A. WINSLOW has succeeded Dr. H. S. Mustard as editor of the *American Journal of Public Health*. Professor Winslow holds the chair of public health at Yale, was president of the American Public Health Association in 1926, and was Sedgwick memorial medallist in 1942. He is as well known among heating and ventilating engineers, bacteriologists, and housing experts as to public health workers. A brilliant and prolific writer, his early work on sewage disposal (Washington, 1906) is regarded here as a classic.

ON Friday, May 26, at 5.30 PM, Dr. J. PURDON MARTIN will speak to the clinical society of the Royal Eye Hospital, Southwark, on ocular palsies.

## Births, Marriages and Deaths

### BIRTHS

BOREL.—On May 2, in London, the wife of Dr. Robert Borel—a daughter.

BROMLEY.—On May 4, at Bury St. Edmunds, the wife of Dr. J. W. Bromley—a son.

BURKE.—On May 1, in London, the wife of Dr. Edmund Burke—a son.

BURSTAL.—On May 1, at Lutterworth, the wife of Dr. E. Worsley Burstal—a daughter.

COGAN.—On April 27, at Southborough, the wife of Dr. John Cogan—a son.

NOLAN.—On April 30, at St. Austell, the wife of Dr. J. P. Nolan—a son.

OGILVIE.—On April 30, at Wadebridge, the wife of Surgeon-Lieutenant Patrick Ogilvie, RNVR—a daughter.

### MARRIAGES

BALDWIN—FYFE.—On April 29, Basil Baldwin to Anne Fullarton Fyfe, MB, BL.

BOLTON—RODWELL.—On April 25, in London, John Henderson Bolton, MRCP, captain RAMC, of Melbourne, Australia, to Elizabeth B. Rodwell, 3rd officer, WRNS.

CHITTY—HOWARTH.—On April 29, in London, Keith Chitty, MB, to Sheila Mary Howarth, MB.

CUMMING—DEWEY.—On April 29, at Caldy, Alister Knox Cumming, MRCS, to Jacqueline Dewey.

GIUSEPPI—BROWNING.—On May 4, at Felixstowe, Paul Leon Giuseppi, FRCS, to Constance Mary Browning.

TURNER—MCNEILL.—On May 6, Anthony Chalmers Turner, MRCS, flight-lieutenant RAFVR, to Kathlyn McNeill.

WEATHERALL—OGSTON.—On April 26, at Oxford, Miles Weatherall, BM, to Josephine A. C. Ogston.

### DEATHS

ALLPORT.—On March 16, at Woking, Henry Kingston Allport, MD, M CH RUI, lieut.-colonel RAMC retd., aged 86.

FENWICK.—On May 5, in London, Edwin Hurry Fenwick, CBE, FRCS, consulting surgeon to the London Hospital.

PARKINSON.—On May 2, Arthur Stanley Parkinson, MD LEEDS, of West Kirby, Cheshire, formerly of Liverpool.

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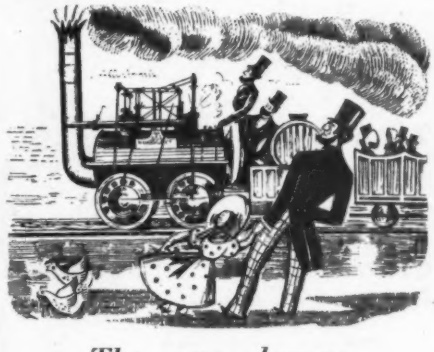

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The seaside house of St. Andrew's Hospital is beautifully situated in a Park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

At all the branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard courts), croquet grounds, golf courses, and bowling greens. Ladies and gentlemen have their own gardens, and facilities are provided for handicrafts, such as carpentry, etc.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: No. 2356 and 2357 Northampton), who can be seen in London by appointment.

# CALDECOTE HALL

NUNEATON

WARWICKSHIRE

('Phone: Nuneaton 241)

Residential treatment of

## "Nervous Disorders" & Alcoholism

(Certifiable cases are not received)

This beautiful mansion situated in the heart of the country (less than two hours from London by L.M.S.R.) and surrounded by charming pleasure grounds in which games and outdoor occupational therapy are available is devoted to the treatment of Alcoholism and "Nerves" by psychotherapeutic and ancillary methods.

*Illustrated Brochure and particulars obtainable from A. E. CARVER, M.D., D.P.M., Resident Medical Superintendent.*

# CAMBERWELL HOUSE, 33, Peckham Road, London, S.E.5

*Telegrams:* "PSYCHOSIS, LONDON" — *Telephone:* RODNEY 4343 (2 lines)

FOR THE TREATMENT OF MENTAL DISORDERS

Completely detached Villas for mild cases. Voluntary Patients received. Twenty acres of grounds; own garden produce. Hard and grass tennis courts, putting greens, Recreation Hall with Badminton Court, and all indoor amusements. Occupational therapy, Calisthenics, Actino-therapy, prolonged immersion baths, shock and also modified insulin treatment. Chapel.

Senior Physician, Dr. HUBERT JAMES NORMAN, assisted by a resident Medical Staff and visiting Consultants

An Illustrated Prospectus giving fees, which are strictly moderate, may be obtained upon application to the Secretary

The Convalescent Branch is HOVE VILLA, BRIGHTON and is 200 ft. above sea-level

# COURT HALL, KENTON, near EXETER

FOR THE TREATMENT OF EIGHT LADIES, VOLUNTARY, TEMPORARY AND CERTIFIED PATIENTS

# CLIFFDEN, TEIGNMOUTH

FOR EARLY AND CONVALESCENT CASES — Recreational Therapies are held daily by skilled Leaders

The house stands high with spacious balconies and extensive views of the South Devon Coast. Beautiful garden. Own Dairy in 25 acres. Private road to beach. There is also a charming house, EBWORTHY, MANATON, DARTMOOR, situated in 20 acres, 1100 ft. up for bracing moorland air

*Resident Physicians*—BERTHA M. MULES, M.D., B.S. ANNE S. MULES, M.R.C.S., L.R.C.P. — *Telephones*—STARCROSS 259 and TEIGNMOUTH 289

# PECKHAM HOUSE, 112, Peckham Road, London, S.E.15

**Telegrams: "Alleviated, London"** — **Telephone: Rodney 2641-2642**

A Private Mental Hospital, for Ladies and Gentlemen suffering from Nervous and Mental Illness, where the amenities of a comfortable home are combined with full investigation and every well-established modern treatment.

Terms from 3½ guineas weekly.

Illustrated Prospectus may be obtained from the Physician Superintendent.

# TOR-NA-DEE SANATORIUM

**Managing Director: DAVID LAWSON, M.D., F.R.S.E.**

FOR THE TREATMENT OF PULMONARY TUBERCULOSIS AND ALLIED DISEASES

Senior Physician and Medical Superintendent: R. Y. KEERS, M.D. (Edin.)

For prospectus apply to The Secretary, Tor-na-Dee, Murtle, Aberdeenshire — Telephone: Cults 107

# CHEADLE ROYAL

CHEADLE CHESHIRE

A Registered Hospital for MENTAL DISEASES, and its Seaside Branch, GLAN-Y-DON, Colwyn Bay, N. Wales

THE object of this Hospital is to provide the most efficient means for the treatment and care of PATIENTS of BOTH SEXES suffering from MENTAL and NERVOUS DISEASES. The Hospital is governed by a Committee appointed by the Trustees of the Manchester Royal Infirmary.

VOLUNTARY, TEMPORARY, AND CERTIFIED PATIENTS RECEIVED

For Terms and further information apply to the MEDICAL SUPERINTENDENT — Telephone: GATLEY 2231

# SPRINGFIELD HOUSE

'Phone: BEDFORD 3417. **Near BEDFORD**

**For Mental Cases with or without Certificates.**

*Ordinary Terms: Five Guineas per week (including Separate Bedrooms for all suitable cases without extra charge).*

For forms of admission, &c., apply to the Resident Physician, CEDRIC W. BOWER.

INTERVIEWS IN LONDON BY APPOINTMENT.

# THE COTSWOLD SANATORIUM

On the Cotswold Hills, seven miles from Cheltenham, Stroud and Gloucester. Fully equipped for the treatment of all forms of Tuberculosis.

**Terms: 5½ to 9½ guineas per week, inclusive.**

**Full particulars from MEDICAL SUPERINTENDENT, COTSWOLD SANATORIUM, CRANHAM, GLOUCESTER.**

**Telephone: Witcombe 2181 Telegrams: "Hoffman Birdlip"**

## BRITISH POSTGRADUATE MEDICAL SCHOOL
(UNIVERSITY OF LONDON)

### WAR SURGERY OF THE NERVOUS SYSTEM
**22nd to 26th May, 1944**

| | | | |
|---|---|---|---|
| Monday, 22nd May | 10 A.M. | The Surgical Anatomy of the Skull and Brain. | Mr. G. C. Knight, F.R.C.S. |
| | 10.30 A.M. | Mechanism and Nature of the Injuries of the Skull. | Mr. G. C. Knight, F.R.C.S. |
| | 11.30 A.M. | Mechanism and Nature of the Concomitant Injury to Brain. | Mr. G. C. Knight, F.R.C.S. |
| | 2 P.M. | Demonstration on Cadaver of Operations on Skull and Brain. | Mr. G. C. Knight, F.R.C.S. |
| Tuesday, 23rd May | 10 A.M. | Management of Closed Head Injuries. | Mr. D. W. C. Northfield, M.S., F.R.C.S. |
| | 11.30 A.M. | Penetrating Wounds of the Skull. | Mr. D. W. C. Northfield, M.S., F.R.C.S. |
| | 2 P.M. | Pathology of Wounds of the Nervous System: (*a*) Injuries of the Brain .. | |
| | 3 P.M. | (*b*) Wounds of Spinal Cord and Peripheral Nerve Injuries. | |
| Wednesday, 24th May | 10 A.M. | Surgical Sequelæ of Wounds of Skull and Brain. | Mr. G. C. Knight, F.R.C.S. |
| | 12.15 P.M. | Use of X-rays in Diagnoses of Head Injuries. | |
| | 2 P.M. | Disorders following Head Injuries. | Dr. J. Purdon Martin, M.D., F.R.C.P. |
| | 3.15 P.M. | Hysterical Disorders Associated with War Wounds. | Dr. Aubrey Lewis, M.D., F.R.C.P. |
| Thursday, 25th May | 10 A.M. | Some Sequelæ of War Wounds of Skull and Brain. | |
| | 11.30 A.M. | War Injuries of the Spinal Cord. | Surg. Capt. Lambert Rogers, F.R.C.S., F.A.C.S. |
| | 1.30 P.M. | X-rays in War Injuries of the Spine. | |
| | 2 P.M. | Demonstration on Cadaver of Operations on Spine. | Surg. Capt. Lambert Rogers, F.R.C.S., F.A.C.S. |
| | 3.15 P.M. | Mental Tests after Head Injuries. | |
| Friday, 26th May | 10 A.M. | The Process of Regeneration after Nerve Injury and the Possibilities of Nerve Grafting. | Mr. J. Z. Young. |
| | 11.30 A.M. | Peripheral Nerve Injuries: (1) Diagnosis. | Prof. Seddon, D.M., F.R.C.S. |
| | 2.15 P.M. | (2) Treatment .. .. | Prof. Seddon, D.M., F.R.C.S. |
| | 3.15 P.M. | Care of Bladder in Injuries of Nervous System. | Mr. Clifford Morson, C.B.E., F.R.C.S. |

Further War Courses commence as follows:—
5TH JUNE, 1944 .. MEDICAL DISEASES IN WAR.

Attention is drawn to daily clinical and pathological teaching:

| | |
|---|---|
| Department of Medicine | Prof. Sir Francis Fraser. |
| Department of Surgery | Prof. G. Grey Turner. |
| Department of Obstetrics | Prof. James Young. |
| Department of Pathology | Prof. J. H. Dible. |

Ward Rounds, Clinics, and Operations take place Mondays to Fridays between 10 A.M. and 4 P.M.

Clinico-pathological Conferences on selected cases:

| | |
|---|---|
| Medical .. .. .. | 11.45 A.M., Wednesdays. |
| Surgical .. .. .. | 12.15 P.M., Fridays. |
| Gynæcological .. .. | 12 NOON, Thursdays. |

Post-mortem Demonstrations at 1.30 P.M.

In addition to these teaching sessions by permanent staff, special clinics as follows:—

| | | |
|---|---|---|
| Neonatal Clinic .. | Tuesdays, 10 A.M. .. | Dr. Lightwood. |
| Sterility Clinic .. .. | Fridays, 2.15 P.M. .. | Mr. Green Armytage. |
| Neurological Clinic .. | Fridays, 11 A.M. .. | Dr. Purdon Martin and Mr. Knight. |
| Radiological Demonstration .. .. | Thursdays, 2 P.M. .. | Dr. E. J. Topham. |
| Skin Clinic .. .. | Thursdays, 2 P.M. .. | Dr. R. T. Brain. |
| Medical Clinic .. .. | Thursdays, 11 A.M. | Sir Adolphe Abrahams. |
| Radiotherapy .. .. | Mondays, 2 P.M. .. | Dr. Constance Wood. |

# THE MAGHULL HOMES FOR EPILEPTICS (Inc.)

## MAGHULL, Near LIVERPOOL

Open Air Occupation and Recreation for Patients, Farming, Gardening, Football, Cricket, Tennis, Bowls, etc. School recognised by Board of Education.

**FEES—**

| | | |
|---|---|---|
| 1st Class (men only) .. .. .. | from £3 | per week |
| 2nd Class (men and women) .. .. | „ 37/6 | „ |
| 3rd Class (men and women) supported by | | |
| Public Assistance Committees .. | „ 27/6 | „ |
| Education Committees .. | „ 33/6 | „ |
| Private .. .. .. .. | „ 21/– | „ |

*For further particulars apply to—*

**C. EDGAR GRISEWOOD, A.C.A., 20, Exchange Street East, LIVERPOOL, 2.**

# CITY OF LONDON MENTAL HOSPITAL

## Near DARTFORD, KENT

Ladies and Gentlemen received for treatment under certificates, and without certificates as either VOLUNTARY or TEMPORARY PATIENTS, at a weekly fee of £2 9s., and upwards

# UNIVERSITY EXAMINATION POSTAL INSTITUTION

**17, RED LION SQUARE, LONDON, W.C.1**

Over 50 years' experience

## POSTAL COACHING FOR ALL MEDICAL EXAMINATIONS

**MEDICAL PROSPECTUS (24 pages)**

sent gratis, along with List of Tutors, &c., on application to the Principal, 17, Red Lion Square, London, W.C.1. (Telephone: HOLborn 6318.)


### L. M. S. S. A.

FINAL EXAMINATION: SURGERY, June 12th, July 10th, August 14th, 1944; MEDICINE, PATHOLOGY, June 19th, July 17th, August 21st, 1944; MIDWIFERY, June 20th, July 18th, August 22nd, 1944; MASTERY OF MIDWIFERY EXAMINATIONS, May and November.

For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

### YORK CLINIC, GUY'S HOSPITAL, London, S.E.1

The York Clinic for Psychological Medicine at Guy's Hospital has now been opened for the treatment of all forms of functional nervous and mental illness. A few beds are available for private patients, but the greater part of the accommodation is at present reserved for Service cases.

Provision has been made for modern forms of treatment and care—medical, occupational, and recreational. As the Clinic is situated within the precincts of Guy's Hospital all the laboratory and radiological facilities of the Hospital are available for carrying out any necessary investigations. The Clinic is staffed with Guy's Hospital nurses and is in every way considered one of the services of the Hospital. Certified cases are not admitted.

Terms, inclusive of medical attention and treatment, on application to the Secretary, York Clinic, Guy's Hospital (Telephone: HOP 3336).

Communications regarding the admission of patients to be addressed to the Medical Director.

### ROYAL COLLEGE OF PHYSICIANS OF LONDON.

The next ordinary PROFESSIONAL EXAMINATION for the MEMBERSHIP will commence on Wednesday, 5th July, 1944.

Candidates are required to give 21 days' notice in writing to the Registrar of the College, to whom all certificates and testimonials required by the Bye-laws must be sent at the same time.

Candidates who propose to submit published work under the regulations now in force are required to give 28 days' notice, and should apply in writing to the Registrar, without delay, for detailed instructions as to the procedure they should follow.

H. E. A. BOLDERO, D.M.,
Pall Mall East, S.W.1. Registrar.

### UNIVERSITY OF GLASGOW.

HENRY MECHAN CHAIR OF PUBLIC HEALTH.

Applications are invited for the above full-time Chair. The appointment will date from 1st October, 1944, or from such later date as may be consistent with the present obligations of the selected candidate. A candidate will not be prejudiced by inability to take up the appointment until after the war. Particulars as to duties, stipend, and conditions of tenure may be obtained from the undersigned, to whom applications should be sent by 15th June, 1944. ROBT. T. HUTCHESON,
27th April, 1944. Acting Secretary of University Court.

**BRITISH POSTGRADUATE MEDICAL SCHOOL.** (University OF LONDON.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE SURGEON (A), vacant 7th July, 1944. The appointment is for 6 months. The salary is at the rate of £105 p.a., plus full residential emoluments. Practitioners liable under the National Service Acts and not completed 3 months since date of qualification may apply.

Apply the Dean, British Postgraduate Medical School, Ducane-road, W.12, before 7th June, 1944.

**BRITISH POSTGRADUATE MEDICAL SCHOOL.** (University OF LONDON). Applications are invited from registered medical practitioners, Male and Female, for the appointment of a RESIDENT ASSISTANT (B1) in the Department of Medicine. Experience in chest work essential. Salary according to qualifications and experience: not less than £350 p.a., with residential emoluments. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

Apply the Dean, British Postgraduate Medical School, Ducane-road, W.12.

**THE ROYAL CANCER HOSPITAL (FREE)** (Incorporated under Royal Charter), Fulham-road, London, S.W.3. Applications are invited for the following posts:—

SENIOR ASSISTANT RADIOTHERAPIST (full-time) at the Hospital. Minimum salary £750 p.a.

JUNIOR ASSISTANT RADIOTHERAPIST at the Hospital. Minimum salary £450 p.a.

Applicants must be registered medical practitioners who hold a Diploma in Medical Radiology. The appointments will be for 12 months, subject to renewal.

Applications, to be made on a form which will be supplied by the Secretary, together with copies of 3 recent testimonials, should be sent not later than the first post on Saturday, 27th May, 1944, to the Secretary.

**THE ROYAL CANCER HOSPITAL (FREE)** (Incorporated under Royal Charter), Fulham-road, London, S.W.3. Applications are invited from registered medical practitioners for the post of ASSISTANT RADIOLOGIST (Part-time) to the Diagnostic Department at the Hospital. The appointment is terminable within 12 months of the conclusion of hostilities. The salary will be according to experience, but will not be less than £400 p.a. Particulars of duties may be obtained from the Director of the Department.

Applications to be made on a form which will be supplied by the Secretary, and should be sent to the Secretary not later than the first post on Monday, 15th May, 1944.

**UNIVERSITY OF LONDON. King's College. The delegacy** will require in September next the services of 2 DEMONSTRATORS IN PHYSIOLOGY (1 for Biochemistry). Salary £100 per term. Candidates should send in their applications, accompanied by copies of 2 recent testimonials, not later than 18th May, 1944, to: The Secretary, King's College, Strand, W.C.2, from whom particulars and forms of application may be obtained.

**THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street**, London, W.C.1. 2 vacancies for HOUSE PHYSICIANS (B2) will occur on 1st July, 1944. Salary £200 p.a., with full residential emoluments. One post is tenable at the Children's Unit at the Sector Hospital, Hemel Hempstead, and the other at the above address. Both appointments are for 6 months. R and W practitioners now holding A posts, and practitioners of either sex ineligible for military service or rejected by the R.A.M.C., may apply.

Further particulars and forms of application, which must be returned not later than 29th May, 1944, are obtainable from—

April, 1944. H. F. RUTHERFORD, Secretary.

**MILLER GENERAL HOSPITAL, Greenwich High-road, S.E.10** Applications are invited from registered medical practitioners, Male, for the appointment of HOUSE SURGEON (A), vacant end of May. Salary is at the rate of £120 p.a., plus share of Ministry of Health allowance, with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, giving full particulars together with copies of 3 recent testimonials, to be sent as soon as possible to—

24th April, 1944. L. G. BAIN, Assistant Secretary.

**THE HOSPITAL FOR WOMEN, Soho-square, W.1. Applications** are invited from fully qualified Men and Women, including R and W practitioners who now hold A posts, for the combined post of RESIDENT MEDICAL OFFICER (B2) and MEDICAL OFFICER to the first-aid post, for the period 1st June, 1944, to 30th November, 1944. To R or W practitioners appointment will be limited to 6 months. Salary approximately £150 p.a., with full board and lodging.

Applications to reach the undersigned not later than 19th May, 1944. D. C. EMERY, Acting Secretary.

**WEIR HOSPITAL, Weir-road, Balham, S.W.12. Applications** are invited from registered medical practitioners (Female) for the appointment of RESIDENT HOUSE SURGEON (B2), vacant the end of May. Salary is at the rate of £200 p.a., with full residential emoluments. W practitioners who now hold A posts may apply, when appointment will be limited to 6 months.

Applications, stating age, qualifications, nationality, and present post, and accompanied by copies of 3 recent testimonials, should be sent to the Honorary Secretary-Superintendent.

**THE WILLESDEN GENERAL HOSPITAL, Harlesden-road**, N.W.10. Applications are invited for the post of CLINICAL PATHOLOGIST, 6 half-day sessions per week. Experience in bacteriology and biochemistry essential. Salary £420 p.a., plus share of private patients' fees.

Applications, stating full particulars, qualifications, and experience, and names of at least 2 referees, to be sent to the undersigned. War-time appointment subject to post-war confirmation. J. N. DRAKE, Secretary.

**LONDON COUNTY COUNCIL. Medical practitioners required** for the undermentioned positions:—

1. TEMPORARY ASSISTANT MEDICAL OFFICER, Class I (B1). Salary £350–£25–£425 a year, plus a temporary cost-of-living bonus.

| | |
|---|---|
| Queen Mary's Hospital for Children, Carshalton, Surrey. | General medical duties. |
| St. Pancras Hospital, St. Pancras-way, N.W.1. | General medical duties (chronic sick). |

Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

2. TEMPORARY ASSISTANT MEDICAL OFFICER, Class II (B2). Salary £250 a year, plus a temporary cost-of-living bonus.

| | |
|---|---|
| St. Stephen's Hospital, 369, Fulham-road, S.W.10. | General medical duties. |
| St. Mary Islington Hospital, Highgate Hill, N.19 (2 vacancies). | (*a*) General medical duties.<br>(*b*) Obstetrics. |
| Lewisham Hospital, Lewisham, S.E.13 (2 vacancies). | (*a*) General medical duties.<br>(*b*) Obstetrics. |
| New End Hospital, Hampstead, N.W.3. | General duties and anæsthetics. |
| St. Giles' Hospital, St. Giles'-road, Camberwell, S.E.5. | General medical duties. |

R and W practitioners who now hold A posts may apply, when appointment will be limited to 6 months.

The above positions are with board, lodging, and washing. Married quarters are not available.

3. TEMPORARY ASSISTANT DISTRICT MEDICAL OFFICER for Area VII, District B (part of the Borough of Lambeth). Provisional salary £250 a year, including allowance for use of surgery. Person engaged required to carry out duties prescribed by Public Assistance Order, 1930, and to reside in or near the district. Remuneration and conditions subject to review.

Application forms obtainable from the Medical Officer of Health (S.D.2), The County Hall, S.E.1 (stamped addressed foolscap envelope necessary), returnable by 30th May, 1944.

Canvassing disqualifies.

**BELGRAVE HOSPITAL FOR CHILDREN, 1, Clapham-road**, London, S.W.9. The Committee of Management invite applications from registered medical practitioners, Male and Female, for the appointment of RESIDENT HOUSE OFFICER (A), vacant 1st June. Salary at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, with copies of testimonials, stating age, should be forwarded as soon as possible to—

THOMAS CLAPHAM, Secretary.

**HAMPSTEAD GENERAL HOSPITAL, Haverstock Hill, N.W.3** Applications are invited from registered medical practitioners, Male and Female, for the appointment of JUNIOR RESIDENT MEDICAL OFFICER (B2) embracing both medical and surgical work, vacant 1st July next, tenable for 6 months. Salary £133 6s. 8d. p.a., with board, lodging, and laundry. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be downgraded temporarily to A. Practitioners qualified for more than 3 months and liable under the National Service Acts (males must be rejected by R.A.M.C.) may also apply.

Applications on the prescribed form, with copies of 3 testimonials, to be returned not later than 18th May.

KENNETH A. F. MILES, House Governor.

**HAMPSTEAD GENERAL HOSPITAL, N.W.3. Applications are** invited from registered medical practitioners, Male and Female, for the appointment of CASUALTY SURGICAL OFFICER (B2), Out-patient Department, Camden Town, N.W.1, vacant 1st June, tenable for 6 months. Salary £100 p.a., plus allowance at £50 p.a. for duties in connexion with First-aid Post established there, with board, lodging, and laundry. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be downgraded temporarily to A. Practitioners qualified for more than 3 months and liable under the National Service Acts (males must be rejected by R.A.M.C.) may also apply.

Applications on the prescribed form, with copies of 3 testimonials, to be returned not later than the 18th May.

KENNETH A. F. MILES, House Governor.

**THE QUEEN ELIZABETH HOSPITAL FOR CHILDREN**, Hackney-road, E.2. Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIAN (A), vacant 1st July, 1944. Appointment will be for 6 months. Salary at rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Application forms may be obtained from the undersigned and should be returned, with copies of not more than 3 testimonials, on or before 3rd June, 1944.

CHARLES H. BESSELL, General Secretary.

**THE QUEEN ELIZABETH HOSPITAL FOR CHILDREN** (Country In-patient Branch 70 Beds), ASHENDENE, BAYFORD, HERTS. Applications are invited from registered medical practitioners, Male and Female, including R and W practitioners now holding A posts, for the appointment of RESIDENT MEDICAL OFFICER (B2), vacant 1st July, 1944. The appointment will be for 6 months. Salary is at rate of £200 p.a., with full residential emoluments.

Application forms may be obtained from the undersigned and should be returned, with copies of not more than 3 testimonials, on or before 3rd June, 1944.

CHARLES H. BESSELL, General Secretary.
Queen Elizabeth Hospital, Hackney-road, E.2.

# HIS MAJESTY'S COLONIAL SERVICE

## THE COLONIAL MEDICAL SERVICE

### VACANCIES FOR MEDICAL OFFICERS

**The maintenance of an efficient Colonial Medical Service constitutes a vital part of the national war effort and it is most important that the Service should be assured of an adequate supply of doctors.**

**The Secretary of State for the Colonies therefore invites applications from doctors possessing a medical qualification registrable in the United Kingdom who are British subjects and who are under thirty-five years of age.**

**Medical Officers are appointed in the first instance for general service. But there are ample opportunities for work in special branches of medicine and surgery, in public health and in medical research.**

**The normal salary scale is from £600 to between £1,000 and £1,120. There are large numbers of super-scale posts to which promotion is made on merit and which carry higher salaries.**

**Government quarters, in many cases free of rent, and first-class passages to and from the Colonies are provided, and an adequate pension scheme is in force.**

**Selected candidates are normally required to attend a course of instruction in Tropical Medicine and Hygiene either before proceeding overseas or during their first period of leave.**

**Further particulars, including the regulations governing admission to the Colonial Medical Service, may be obtained from the Director of Recruitment (Colonial Service), 2, Park-street, London, W.1.**

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**CHELSEA HOSPITAL FOR WOMEN, S.W.3.** The Council of the above Hospital have decided to appoint an HONORARY ENDOCRINOLOGIST for the duration of the war (in the first instance). The duties will be to undertake the investigation and treatment of endocrine disorders.

Applications from suitably qualified medical practitioners, giving full details, and enclosing copies of 3 recent testimonials, should reach the undersigned not later than Friday, 26th May.

GEO. W. COOLING, Secretary.

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**CHELSEA HOSPITAL FOR WOMEN, S.W.3. Applications are** invited from registered medical practitioners, Male or Female, for the post of HOUSE SURGEON (B2) from the 1st July, 1944. Salary is at the rate of £200 p.a., together with board, residence, and laundry. R and W practitioners holding A posts may also apply, when the appointment will be limited to 6 months.

Applications, giving full particulars as to qualifications, &c., accompanied by copies of 3 recent testimonials, should be forwarded not later than Friday, 26th May, to—

GEO. W. COOLING, Secretary.

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**ROYAL NORTHERN HOSPITAL, Holloway, N.7. Applications** are invited from registered medical practitioners for the appointment of HOUSE SURGEON (A), vacant 1st June, for a period of 6 months. Salary and emoluments approximately £120 p.a., and board, residence, and laundry. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications, stating age, qualifications with dates, and nationality, accompanied by copies of 3 recent testimonials, should be sent not later than 19th May, 1944, to—

GILBERT G. PANTER, Secretary.

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**WEST HAM HOSPITAL FOR NERVOUS AND MENTAL DISORDERS, GOODMAYES, ILFORD.** Applications are invited from medical practitioners, including R and W practitioners holding B2 posts, for the post of TEMPORARY ASSISTANT MEDICAL OFFICER (B1). The Hospital is situated near London and facilities will be granted for post-graduate study. The salary commences at £350 p.a., plus war bonus and with full residential emoluments. An additional £50 p.a. will be paid if in possession of the D.P.M. R practitioners holding B1 posts and rejected by the R.A.M.C. may also apply.

Applications in writing, accompanied by recent testimonials, should be sent to the Medical Superintendent.

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**THE NELSON HOSPITAL, Merton, S.W.20. Applications are** invited from registered medical practitioners, Male, for the appointment of HOUSE SURGEON (B2), now vacant. Salary at the rate of £250 p.a., with full residential emoluments. R practitioners holding an A post may also apply, when appointment will be limited to 6 months; otherwise may be extended.

Apply to the Secretary.

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**MIDDLESEX COUNTY COUNCIL. Middlesex Colony, Certified INSTITUTION, SHENLEY, near ST. ALBANS.** Applications are invited from registered medical practitioners, Male or Female, not liable for war service, for the post of ASSISTANT MEDICAL OFFICER (B1). Salary from £460 to £660 p.a., according to qualifications and experience (plus bonus, now £22 2s. p.a.), with meals, laundry, and furnished accommodation. The appointment will be in a temporary capacity, and determinable by 3 months' notice on either side.

Applications, with copies of not more than 3 recent testimonials, should be addressed to the undersigned, and state earliest date when available for duty. A medical examination may be required.

C. W. RADCLIFFE, "B3," Clerk of the County Council.
Middlesex Guildhall, Westminster, S.W.1.

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**LIVERPOOL AND DISTRICT HOSPITAL FOR DISEASES OF THE HEART, 34, Oxford-street, LIVERPOOL, 7.** Applications are invited from registered medical practitioners (Male or Female) for the appointment of a HOUSE PHYSICIAN (A), to commence 1st July. Salary is at the rate of £100 p.a., with full residential emoluments. Facilities for M.D. thesis. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent to: Miss J. LEWIS, Secretary.

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**THE WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10.** FIRST ASSISTANT wanted for Diabetic Clinic. Please apply with brief particulars in first instance to the Secretary.

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**KING EDWARD MEMORIAL HOSPITAL, Ealing. Applications** are invited from registered medical practitioners for the appointment of CASUALTY OFFICER AND HOUSE SURGEON (A) (Gynæcological, &c.), vacant now. 6 months' appointment. Salary at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications, stating age, nationality, qualifications with dates, and details of experience, together with copies of 2 recent testimonials, should be sent immediately to—

R. A. MICKELWRIGHT, House Governor.

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**CITY OF LONDON MENTAL HOSPITAL, Stone, near Dartford, KENT.** Applications are invited from registered medical practitioners for the post of TEMPORARY MEDICAL OFFICER (B1) at the above Hospital. Salary 10 guineas per week, plus residential emoluments. Suitably qualified R practitioners holding B2 appointments, also those now holding B1 and rejected by the R.A.M.C., may apply.

Applications, stating age, qualifications, and experience, together with copies of 2 recent testimonials, should be sent as soon as possible to the Acting Medical Superintendent.

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**CHILDREN'S SANATORIUM, Stannington, Northumberland.** (Established 1907.) Temporarily evacuated to THE HYDRO, HEXHAM. Applications are invited from registered medical practitioners (Male or Female) for the appointment of RESIDENT MEDICAL SUPERINTENDENT at the above Sanatorium which at present contains 204 patients (approximately 60 bed and 140 ambulant) for the treatment of pulmonary and non-pulmonary tuberculosis in children aged 3–16 years. (At Stannington the bed complement is 310 and patients will return there after the war.) Candidates should be physicians with hospital administrative experience, and importance will be attached to previous experience in the treatment of tuberculosis. Commencing salary £650 p.a., rising to £800 p.a. (by annual increments of £25, subject to satisfactory service), with residential emoluments valued at not less than £150 p.a.

Applications, giving full particulars and accompanied by 3 recent testimonials, should be forwarded not later than 27th May, 1944, to: Mr. ERIC H. CHRISP, Acting Secretary, Children's Sanatorium, The Hydro, Hexham, Northumberland.

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**CHILDREN'S SANATORIUM, Stannington, Northumberland.** (Established 1907.) Temporarily evacuated to THE HYDRO, HEXHAM. (204 Beds for pulmonary and non-pulmonary tuberculosis.) Applications are invited from registered Women medical practitioners for a B2 appointment at the above Sanatorium. Applicants should have held a house appointment and preference will be given to those having some experience in bacteriology. Salary £150 p.a., with residential emoluments. W practitioners holding A posts may also apply, when appointment will be limited to 6 months.

Applications should be forwarded not later than 20th May, 1944, to: Mr. ERIC H. CHRISP, Acting Secretary, Children's Sanatorium, The Hydro, Hexham, Northumberland.

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**NORTHAMPTON GENERAL HOSPITAL. (408 Beds.) Applications** are invited immediately from registered medical practitioners, Male and Female, for the appointments of RESIDENT ANÆSTHETIST (A) and HOUSE SURGEON (A) to the Ear, Nose, and Throat Department. Salary at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointments will be for a period of 6 months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent as soon as possible to: GORDON S. STURTRIDGE.

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**COUNTY BOROUGH OF READING. Battle Hospital. (E.M.S., 300 Beds; Municipal General, 308 Beds.)** RESIDENT ASSISTANT MEDICAL OFFICERS (B2) required at the above Hospital for general duties. Salary at the rate of £300 p.a., with full residential emoluments for a single person. R and W practitioners holding A posts may also apply, when appointments will be limited to 6 months; otherwise renewable up to 12 months.

Forms of application to be obtained from, and returned to, the undersigned and should be accompanied by copies of not less than 3 recent testimonials. C. S. JOHNSON, Town Clerk.

Town Hall, Reading, 13th May, 1944.

**COUNTY BOROUGH OF BURY. Applications are invited** from duly registered medical practitioners holding a degree or diploma in Public Health for the appointment (temporary) of MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER for the County Borough of Bury.

The person appointed shall control and be responsible to the Council or its appropriate Committees or Subcommittees for—

(*a*) the management of the Public Health Department of the Corporation and the staff engaged therein;
(*b*) the medical inspection of school-children and all other school medical work;
(*c*) maternity and child welfare work;
(*d*) the supervision of midwives;
(*e*) the Council's work in connexion with tuberculosis;
(*f*) venereal diseases work (Administrative Officer);
(*g*) the medical side of the Council's Poor Law work;
(*h*) the medical examination of candidates for appointments.

He shall advise and assist the Council in the execution of their powers and duties in connexion with the Civil Defence Casualty Services, and shall in general carry out such other duties as the Council may from time to time require of him and shall devote the whole of his time to the duties of the office and not engage in private practice.

The commencing salary shall be £1000 p.a., rising by annual increments of £50 to £1100 p.a., plus cost-of-living bonus, and the appointment will be determinable by 1 month's notice on either side.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications endorsed "Medical Officer of Health," stating age, qualifications, and experience, and accompanied by copies of 3 recent testimonials, should reach the undersigned not later than 25th May, 1944.

Candidates must submit with their applications full information as to their liability for military service, medical fitness, and position as regards deferment.

Canvassing, directly or indirectly, will be a disqualification.

H. D. A. ROBERTSON, Town Clerk.

Municipal Offices, Bank-street, Bury, Lancs.

**MANCHESTER ROYAL INFIRMARY. Resident Orthopædic** REGISTRAR (B1). The Board of Management invite applications for the above post, vacant 1st June, from registered medical practitioners, Male or Female. Applicants to have held hospital appointments and had orthopædic experience. Salary £150 p.a., with residence. Suitably qualified R and W practitioners holding B2 posts, also R practitioners now holding B1 and rejected by the R.A.M.C., may apply.

Applications, stating age, nationality, and accompanied by copies of 3 testimonials, to be sent to the Chairman of the Medical Board not later than 20th May, 1944.

By Order,

F. J. CABLE, General Superintendent and Secretary.

**KENT AND SUSSEX HOSPITAL, Tunbridge Wells. (506 Beds.)** Applications are invited from registered medical practitioners (Male and Female) for the appointment of RESIDENT ANÆSTHETIST AND HOUSE PHYSICIAN (B2), vacant 1st June, 1944. Salary at the rate of £200 p.a., with full residential emoluments. R and W practitioners holding A posts may also apply, when appointment will be limited to 6 months; otherwise for a period of 6 to 12 months.

Applications to: E. A. WAGSTAFF, Superintendent-Secretary. 5th May, 1944.

**CITY MENTAL HOSPITAL, Nottingham. Applications are invited** from registered medical practitioners for the appointment of TEMPORARY ASSISTANT MEDICAL OFFICER (B1). The appointment is whole time. Previous experience in a mental hospital is desirable but not necessary. Salary £3[illegible] to £450 p.a. by 4 £25 increases, with full residential emoluments, with an additional £50 p.a. for D.P.M. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and rejected by the R.A.M.C., may apply.

Applications to be sent to the Medical Superintendent.

**ADDENBROOKE'S HOSPITAL, Cambridge. Applications are** invited from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIAN (A), vacant 30th June, 1944. Salary is at the rate of £130 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months only, which is the normal period of appointment.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent not later than Wednesday, 24th May, 1944, to—

J. A. BEARDSALL, Secretary-Superintendent.

**NOTTINGHAM CITY COUNCIL. City Hospital Maternity** DEPARTMENT. (100 Beds.) Applications are invited from registered medical practitioners (Male) for the appointment of OBSTETRIC HOUSE SURGEON (A). The appointment will be limited to 6 months. Salary at the rate of £250 p.a., with full residential emoluments, plus cost-of-living bonus. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply.

Applications, stating age, qualifications with dates, and nationality, should be accompanied by copies of 3 testimonials and sent to: J. E. RICHARDS, Town Clerk.

The Guildhall, Nottingham, May, 1944.

**KENT COUNTY COUNCIL. County Hospital, Farmborough,** near Bromley. (1000 Beds.) PART-TIME ANÆSTHETIST required for 4 afternoons a week. Salary payable £2 12*s.* 6*d.* a session, together with third-class travelling expenses.

Applications, stating age, qualifications, and the names and addresses of 2 responsible persons to whom reference may be made as to professional ability, to be sent to the Medical Superintendent at the hospital by the 23rd May, 1944.

W. L. PLATTS, Clerk of the County Council.

County Hall, Maidstone, 1st May, 1944.

**HALIFAX GENERAL HOSPITAL (Al—400 Beds.) Applications** are invited from registered medical practitioners, Male or Female, for the following appointments:—

RESIDENT ASSISTANT MEDICAL OFFICER (B2), at a salary of £200 p.a., together with the usual residential allowances. R and W practitioners who now hold A posts may apply, when the appointment will be limited to 6 months; otherwise it may be renewed for a further period of 6 months.

HOUSE PHYSICIAN (A). Salary at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent to the Medical Superintendent. Duties to commence end of June.

**COUNTY BOROUGH OF BURNLEY. Applications are invited** from medical practitioners, either sex, for the position of TEMPORARY ASSISTANT MEDICAL OFFICER OF HEALTH. The duties will be mainly in connexion with the School Medical Service but will include maternity and infectious diseases. Salary £500 p.a., rising by £25 p.a. to a maximum of £700 p.a., plus bonus.

Conditions of appointment and forms of application may be obtained from the Medical Officer of Health, St. James's-street, Burnley, to whom applications must be returned as soon as possible. ARCHIBALD GLEN, Town Clerk.

Town Hall, Burnley, 3rd May, 1944.

**EAST RIDING COUNTY COUNCIL. Driffield Emergency** HOSPITAL. (360 Beds.) Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE SURGEON (B1), vacant immediately. Hospital provides experience in general surgery and gynæcology. Salary at the rate of £275–£350 p.a., with full residential emoluments according to experience. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners now holding B1 and rejected by the R.A.M.C., may apply.

Applications, stating age, qualifications, and previous experience, should be forwarded to—

T. STEPHENSON, Clerk of the Council.

County Hall, Beverley, 6th May, 1944.

**BIRMINGHAM UNITED HOSPITAL. The General Hospital.** THE QUEEN ELIZABETH HOSPITAL. (Also incorporating the QUEEN'S HOSPITAL 1840–1941.) Applications are invited for the post of SURGICAL CASUALTY OFFICER at the General Hospital. Salary £500 p.a. The officer will be in charge of the Casualty Department.

Applications, stating age, nationality, qualifications with dates, experience, and accompanied by copies of 3 recent testimonials, should be sent to the undersigned, from whom all further information may be obtained.

G. HURFORD, Secretary, Birmingham United Hospital.

The Queen Elizabeth Hospital, Birmingham, 15,
5th May, 1944.

**CITY OF NORWICH. Woodlands Hospital. (311 Beds.) Appli**cations are invited from registered medical practitioners for the appointment of ASSISTANT RESIDENT MEDICAL OFFICER (B2), vacant 1st July, 1944. The salary is at the rate of £250 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply, when the appointment will be limited to 6 months; otherwise to 1 year.

Further particulars of appointment to be obtained from the Senior Medical Officer, Woodlands Hospital, Bowthorpe-road, Norwich, and to whom applications should be sent.

BERNARD D. STOREY, Town Clerk.

City Hall, Norwich, May, 1944.

**LEIGH INFIRMARY, Lancs. (General Hospital—102 Beds.) Appli**cations are invited from registered medical practitioners, Male and Female, for the following appointments:—

HOUSE SURGEON (A), shortly vacant. Salary is at the rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months; otherwise for a period of 12 months. Applications from friendly alien practitioners are also invited.

RESIDENT SURGICAL OFFICER (B1), vacant immediately. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Salary is at the rate of £400 p.a. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

Applications, stating age and accompanied by copies of 3 testimonials, to be addressed to: F. M. EVISON, Acting Secretary.

**BLACKBURN AND EAST LANCASHIRE ROYAL INFIRMARY.** (248 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIAN (A), vacant at present. Salary is at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, stating age, nationality, and experience, together with copies of 3 recent testimonials, should be sent as early as possible to— T. DEWHURST,

General Superintendent and Secretary.

Royal Infirmary, Blackburn.

**COUNTY MENTAL HOSPITAL, Prestwich, Manchester.** LOCUM TENENS MEDICAL OFFICER required immediately with a view to appointment as Temporary Medical Officer (B1). Salary £8 per week, plus full residential emoluments. Scale for Temporary Medical Officer is £550 p.a., rising to £600 p.a., plus war bonus. Male R practitioners holding B2 posts, also those holding B1 and rejected by the R.A.M.C., may apply.

Apply to the Medical Superintendent, County Mental Hospital, Prestwich, Manchester.

**COVENTRY AND WARWICKSHIRE HOSPITAL.** Applications are invited from registered medical practitioners, Male and Female, including R and W practitioners who now hold A posts, for the appointment of HOUSE SURGEON (B2) to the Gynæcological and Obstetric Department, now vacant, and for the appointment of HOUSE SURGEON (B2) for general surgical duties, vacant 15th May next. The appointments are for 6 months. Salary at the rate of £150 p.a., plus £20 p.a. cost-of-living bonus, together with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent immediately to—

S. CECIL HILL, House Governor and Secretary.

**MARGATE AND DISTRICT GENERAL HOSPITAL.** (100 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT MEDICAL OFFICER (A). Salary is at the rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when appointment will be for a period of 6 months.

Applications should be sent immediately to the Secretary.

**THE SOUTHAMPTON CHILDREN'S HOSPITAL AND DISPENSARY FOR WOMEN.** Applications are invited from registered medical practitioners, Men or Women, for the appointment of RESIDENT MEDICAL OFFICER (A), now vacant. Salary is at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when appointment will be for 6 months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by 3 testimonials, should be sent immediately to: ELLA K. MATTHEWS, Secretary.

**ROYAL ISLE OF WIGHT COUNTY HOSPITAL, Ryde, I.W.** Applications are invited from registered medical practitioners, either sex, for the appointment of HOUSE SURGEON (B2), now vacant. The appointment will be for 6 months. Salary at the rate of £180 a year, with board, residence, and laundry. As this is the senior post, previous surgical experience is advisable. R and W practitioners holding A posts may apply.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent without delay to—

A. S. GORDON, Secretary.

**THE ROYAL GWENT HOSPITAL, Newport, Mon.** (255 Beds, plus 130 E.M.S. Beds.) Applications are invited for the appointment of CASUALTY OFFICER (B2) from registered medical practitioners, including R and W practitioners who now hold A posts. Salary will be at the rate of £210 p.a., with full residential emoluments. To R or W practitioners appointment will be limited to 6 months.

Applications, stating age, nationality, qualifications with dates, and details of previous appointments, accompanied by 3 recent testimonials, should be sent immediately to—

ALAN RUDDLE, Secretary-Superintendent.

29th April, 1944.

**ROYAL MANCHESTER CHILDREN'S HOSPITAL, Pendlebury,** near MANCHESTER. Applications are invited for the post of RESIDENT SURGICAL OFFICER (B1). Salary £175 p.a. The appointment is for a period of 6 months, commencing 1st June, 1944. Suitably qualified R practitioners holding B2 posts, also those now holding B1 and rejected by the R.A.M.C., may apply.

Applications, stating age, and accompanied by copies of not more than 3 recent testimonials, to be sent to the undersigned immediately. By Order,

H. HEARDMAN, General Superintendent and Secretary.

**THE PRINCE OF WALES'S HOSPITAL, Plymouth.** Applications are invited from registered medical practitioners for the appointment of HOUSE SURGEON (A), vacant forthwith. Salary is at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

ARTHUR R. CASH, General Superintendent.

Head Office, Greenbank-road, Plymouth.

**PRESTON AND COUNTY OF LANCASTER ROYAL INFIRMARY.** MATERNITY HOSPITAL. Applications are invited from registered medical practitioners (Female) for the appointment of RESIDENT OBSTETRICIAN (B2). The salary is at the rate of £200 p.a., but a higher salary will be offered to a practitioner holding the D.R.C.O.G. W practitioners who now hold A posts may apply, when appointment will be limited to 6 months.

Applications, stating age and qualifications with dates, accompanied by copies of 3 recent testimonials, to be sent to:

JOHN GIBSON, Superintendent, Royal Infirmary, Preston.

**THE STAMFORD, RUTLAND AND GENERAL INFIRMARY.** Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT ANÆSTHETIST (B2), now vacant. The salary is at the rate of £350–£400 p.a., according to experience of applicant, with full residential emoluments. R and W practitioners who now hold A posts may apply, when appointment will be limited to 6 months; otherwise for a period of 3 months.

Applications, stating age, qualifications with dates, nationality, and accompanied with copies of 3 recent testimonials, should be sent immediately to: H. F. DONALD, Secretary.

**SALISBURY GENERAL INFIRMARY.** (Voluntary Hospital—225 Beds.) Applications are invited from registered medical practitioners for the appointment of 2 HOUSE SURGEONS (A), vacant now and early May respectively. Salary at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when appointment will be for a period of 6 months.

Applications, stating age, nationality, qualifications, and experience, together with copies of recent testimonials, should be sent to: JOHN WILLIAMS, Superintendent and Secretary.

**BODMIN EMERGENCY HOSPITAL.** Applications are invited from registered medical practitioners, Male or Female, for the appointment of RESIDENT HOUSE SURGEON (B2). The salary is at the rate of £200 p.a., with full residential emoluments. R and W practitioners holding A posts may also apply, when appointment will be limited to 6 months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 (recent) testimonials, should be sent to the Medical Superintendent, Bodmin Emergency Hospital, Bodmin, Cornwall, as soon as possible.

**HUDDERSFIELD ROYAL INFIRMARY.** (321 Beds.) Resident ANÆSTHETIST AND ASSISTANT CASUALTY OFFICER (A), required to commence as soon as possible. Salary at the rate of £150 p.a. with full resident emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications to— H. J. JOHNSON,

General Superintendent and Secretary.

**VICTORIA HOSPITAL, Burnley.** (169 Beds.) Applications are invited from registered medical practitioners for the appointment of 2 HOUSE SURGEONS (A), vacant early May.

The salary in each case is at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointments will be for a period of 6 months.

Applications to be sent to: J. E. WHEATCROFT, Secretary.

**VICTORIA HOSPITAL, Accrington.** Applications are invited from registered medical practitioners, Male, for the appointment of a HOUSE PHYSICIAN (A) at a salary of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when appointment will be limited to 6 months.

Applications, with copies of testimonials, to Honorary Secretary, Victoria Hospital, Accrington.

**THE PRINCE OF WALES'S HOSPITAL, Plymouth.** Applications are invited from registered medical practitioners for the appointment of HOUSE SURGEON to Special Departments and CASUALTY OFFICER (A) for duty at the Greenbank Road Section, vacant forthwith. Salary is at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

ARTHUR R. CASH, General Superintendent.

Head Office: Greenbank-road, Plymouth, 20th April, 1944.

**HULL ROYAL INFIRMARY.** Applications are invited from registered medical practitioners for the post of CASUALTY OFFICER (A), vacant now. Duties in the Casualty and Out-patient Departments and some ward work. Salary £200 p.a. The post carries full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications should be addressed to—

R. J. CARLESS, House Governor.

**DORSET COUNTY COUNCIL. Portwey Hospital, Weymouth.** (215 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT MEDICAL OFFICER (B2), vacant 22nd May, 1944. The salary is at the rate of £200 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply, when the appointment will be limited to 6 months; otherwise for a period of 1 year.

Applications, with copies of recent testimonials or references, should be sent forthwith to the Medical Superintendent, Portwey Hospital, Weymouth.

C. P. BRUTTON, Clerk of the County Council.

**DISTRICT INFIRMARY, Ashton-under-Lyne.** (200 Beds, mainly surgical.) Applications are invited from registered medical practitioners, Male or Female, preferably with experience of anæsthetics, for the appointment of HOUSE SURGEON (A), immediately. Commencing salary is at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when the appointment will be for a period of 6 months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent immediately to—

FRANK OLIVER, General Superintendent and Secretary.

**SALFORD ROYAL HOSPITAL.** Applications are invited from registered medical practitioners (Male) for the appointment of HOUSE SURGEON (A) to G.U. Department. Salary at the rate of £150 p.a., with full residential emoluments. Appointment is for 6 months. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply.

Applications to be made immediately on a special form obtainable from—

H. B. SHELSWELL, General Superintendent and Secretary.

**SALFORD ROYAL HOSPITAL.** Applications are invited from registered medical practitioners (Male and Female) for the appointment of HOUSE SURGEON (A) to Special Departments. Salary at the rate of £150 p.a., with full residential emoluments. Appointment is for 6 months. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply.

Applications to be made immediately on a special form obtainable from—

H. B. SHELSWELL, General Superintendent and Secretary.

**GRAVESEND AND NORTH KENT HOSPITAL, Kent.** Applications are invited from registered medical practitioners, Male, for the appointment of 2 HOUSE SURGEONS (A), now vacant. Salary is at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications to: C. E. CHAPMAN, Secretary-Superintendent.

**ESSEX COUNTY COUNCIL. Applications are invited for the** temporary appointment of MEDICAL OFFICER on the Central Staff of the Public Health Department. The duties of the officer appointed will be mainly concerned with the administration of the medical aspects of the Council's Civil Defence functions. Administrative and operational experience in regard to (*a*) casualty services, and (*b*) homeless persons scheme, is essential. The salary attaching to the post is one at the rate of £750 a year, together with war bonus and travelling allowance. Previous experience in the Public Health Department of a large Local Authority will be an advantage.

Applications must be made on the prescribed form, obtainable from the undersigned, accompanied by copies of not more than 3 recent testimonials, which will not be returned, and should be delivered at the County Hall, Chelmsford, not later than 16th May, 1944.

JOHN E. LIGHTBURN, Clerk of the County Council.

County Hall, Chelmsford, 24th April, 1944.

**MONTAGU HOSPITAL, Mexborough, Yorks. (123 Beds—4 Resi**dents.) Applications are invited from registered medical practitioners for the post of RESIDENT SURGICAL OFFICER (B1). Commencing salary £500–£600, according to qualifications. The post will fall vacant at the end of July. The post offers excellent opportunities for surgical experience. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and rejected by the R.A.M.C., may apply.

Applications to be forwarded to—

A. W. YOUNGS, F.C.I.S., Secretary-Superintendent.

**MONTAGU HOSPITAL, Mexborough, Yorks. (123 Beds—4 Resi**dents.) Applications are invited from registered medical practitioners (Male or Female) for the post of HOUSE PHYSICIAN AND OBSTETRIC OFFICER (A), vacant end of this month. Commencing salary £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months; otherwise may be renewed.

Applications to be forwarded to—

A. W. YOUNGS, F.C.I.S., Secretary-Superintendent.

**PRINCESS ALICE HOSPITAL, Eastbourne. Applications are** invited from registered medical practitioners, Male and Female, for the post of HOUSE SURGEON (A), now vacant. The appointment will be for 6 months. Salary at the rate of £250 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications, with copies of 3 testimonials, should be sent forthwith to the Secretary.

**ST. ALBANS AND MID HERTS HOSPITAL, St. Albans, Herts.** (75 Beds.) Applications are invited from registered medical practitioners, Male or Female, for the appointment of ASSISTANT RESIDENT MEDICAL OFFICER (A), vacant in June. Salary at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, together with copies of testimonials, should be sent to: P. R. BATTISON, Secretary.

**ROYAL SURREY COUNTY HOSPITAL, Guildford. (341 Beds.)** Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIAN/CASUALTY OFFICER (A), vacant 1st June, 1944. The appointment will be for a period of 6 months and is recognised for the M.D. examination. Salary is at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications, stating age, nationality, qualifications, and experience, with copies of not more than 3 testimonials, should be received by the Secretary-Superintendent by 19th May, 1944.

**NOTTINGHAM AND MIDLAND EYE INFIRMARY. Applications** are invited from registered medical practitioners (Male and Female) for the appointment of HOUSE SURGEON (B1). Applicants should have had some surgical ophthalmic experience. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners now holding B1 and rejected by the R.A.M.C., may apply. Salary £300 p.a., with full residential emoluments. Post recognised for D.O.M.S. examination.

Applications should be sent forthwith to—

T. R. MOORE, Secretary.

**CITY OF PORTSMOUTH. Saint Mary's Hospital. (1200 Beds.)** Applications are invited from Male registered practitioners, including R practitioners who now hold A posts, for the appointment of RESIDENT MEDICAL OFFICER (B2), now vacant. The salary is at the rate of £300 p.a., with residential emoluments valued at £150 p.a., and a temporary cost-of-living bonus at present payable at the rate of 9s. 6d. per week. To R practitioners (liable under the National Service Acts) the appointment will be limited to a period of 6 months; otherwise for a period of 12 months.

Application forms may be obtained from, and must be returned to, the Medical Officer of Health, Northern Secondary School, Mayfield-road, Portsmouth. FREDERICK SPARKS,

Municipal Offices, Royal Beach Hotel, Town Clerk.

Southsea, 25th April, 1944.

**HEREFORDSHIRE GENERAL HOSPITAL, Hereford. (210 Beds.)** Applications are invited from registered medical practitioners, including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointment of JUNIOR HOUSE SURGEON (A), including House Surgeon to Ear, Nose, and Throat Department. The appointment will be limited to 6 months. Salary is at the rate of £150 p.a., with full residential emoluments.

Applications, stating age, qualifications, and nationality, and accompanied by copies of 3 recent testimonials, should be sent to: T. W. UPTON, Secretary.

**CITY AND COUNTY OF NEWCASTLE UPON TYNE. Tem**porary appointment of an ASSISTANT MEDICAL OFFICER OF HEALTH. Applications are invited from registered medical practitioners holding a registrable Diploma in Sanitary Science, Public Health, or State Medicine for the above appointment at a salary within the scale of £600 p.a., rising by annual increments of £37 10s. to £750 p.a. (according to experience), plus cost-of-living bonus which is at present £33 16s. p.a. Candidates should be over military age or otherwise exempt from service with the Forces, for reasons which must be stated in the application. The person appointed will be required to work under the direction of the Medical Officer of Health on general duties in connexion with the work of the Health Department. The appointment is subject to 1 month's notice on either side, and also to the provisions of the Local Government Superannuation Act, 1937.

Applications, stating age, qualifications, and full details of experience, and accompanied by copies of 3 recent testimonials, should be sent immediately to the Medical Officer of Health, Town Hall, Newcastle upon Tyne, 1.

**COUNTY BOROUGH OF WALSALL. Applications are invited** for the post of TEMPORARY ASSISTANT MEDICAL OFFICER OF HEALTH, Male or Female. Salary £600 p.a., rising by annual increments of £25 to £700 p.a. Applicants must be registered medical practitioners, and preference will be given to one possessing a Diploma in Public Health. The application should be accompanied by full information as to liability for military service, medical fitness, and deferment. The officer appointed will be required to take part in the general public health work of the Borough, including maternity and child welfare, school medical work, and infectious diseases.

Forms of application, statement of duties, and terms and conditions of appointment may be obtained from the undersigned. Applications should be sent to me as soon as possible. Envelopes to be marked outside "Application Asst. M.O.H." The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937.

Council House, Walsall. W. STALEY BROOKES, Town Clerk.

**ROYAL CORNWALL INFIRMARY, Truro. (330 Beds—6 Resi**dents.) Applications are invited from registered practitioners (Male or Female) for the appointment of HOUSE SURGEON (B2) to the Orthopædic and Accident Department. Two vacancies will occur soon. Salary is at the rate of £200 p.a., with full residential emoluments. R and W practitioners holding A posts may also apply, when appointment is limited to 6 months.

Applications should be addressed to the Secretary.

16th February, 1944.

**ROYAL CORNWALL INFIRMARY, Truro. (330 Beds—5 Resi**dential.) Applications are invited from registered practitioners (Male or Female) for the appointment of HOUSE SURGEON (B2) to the General Surgical and Gynæcological Departments. Salary is at the rate of £200 p.a., with full residential emoluments. R and W practitioners holding A posts may also apply, when appointment will be limited to 6 months.

Applications should be addressed to the Secretary.

**ROYAL UNITED HOSPITAL, Bath. Applications are invited** from registered medical practitioners for the appointments of 3 HOUSE SURGEONS (A). Salary for each post £150 p.a., with board, residence, and laundry. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointments will be for a period of 6 months.

Applications at once to— J. LAWRENCE MEARS,

8th February, 1944. Secretary-Superintendent.

**ROYAL UNITED HOSPITAL, Bath. Applications are invited** from registered medical practitioners for the post of HOUSE SURGEON (B2) to the Fracture and Orthopædic Department. Salary £250 p.a., with board, residence, and laundry. R and W practitioners holding an A post may apply, when appointment will be limited to 6 months.

Applications, stating age, qualifications, and experience, together with copies of testimonials, should be addressed at once to: J. LAWRENCE MEARS, Secretary-Superintendent.

5th April, 1944.

**MANCHESTER ROYAL EYE HOSPITAL. Applications are invited** from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A), now vacant. Salary at the rate of £120 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, stating age, qualifications, nationality, and accompanied by copies of 3 recent testimonials, should be sent to: H. R. NORTH, General Superintendent.

**WEYMOUTH AND DISTRICT HOSPITAL, Weymouth, Dorset.** Applications are invited from registered medical practitioners for appointment of HOUSE SURGEON (B2), now vacant. The appointment is open to Male or Female candidates and is for a period of 6 months at a salary of £200 p.a., with full residential emoluments. R and W practitioners holding A posts may also apply.

Applications to be addressed as soon as possible to the Secretary-Superintendent of the Hospital.

**ST. MARGARET'S HOSPITAL, Epping. Applications are invited** from registered medical practitioners, Male and Female, including R and W practitioners who now hold A posts, for the appointment of a HOUSE OFFICER (B2) at the above Hospital. The salary is at the rate of £200 p.a., with full residential emoluments. To R or W practitioners the appointment will be limited to 6 months; otherwise not exceeding 1 year.

Applications should be made in writing to the County Medical Officer, County Hall, Chelmsford, and should include applicant's full name, age, nationality, qualifications, and details of previous posts (if any), and whether liable under the National Service Acts.

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**CARDIFF ROYAL INFIRMARY.** Applications are invited from registered medical practitioners for the following appointments:—

RESIDENT MEDICAL OFFICER (B1), vacant 31st July, 1944. Applicants should have held house appointments and had medical experience. Preference will be given to candidates holding diploma of M.R.C.P. Salary is at the rate of £250 p.a., with full residential emoluments. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners now holding B1 and rejected by the R.A.M.C., may apply.

RESIDENT ANÆSTHETIST (B2), now vacant. The salary is at the rate of £125 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply, when the appointment will be limited to 6 months; otherwise for a period of 12 months.

Applications to be sent as soon as possible to—
R. ARMSTRONG, Medical Superintendent.

**DUMFRIES AND GALLOWAY JOINT SANATORIUM BOARD.** Applications are invited from suitably qualified registered medical practitioners for the appointment of RESIDENT ASSISTANT MEDICAL SUPERINTENDENT (B1) at (1) the Board's Sanatorium at Lochmaben, Dumfriesshire, and (2) the adjoining infectious diseases hospital. The officer appointed will be required to devote his whole time to the duties and not to engage in private practice. For a married officer a free house with laundry will be available, and for an unmarried one free quarters with board and laundry will be provided. According to qualifications, experience, and nature of the emoluments, the salary will be adjusted to fall between £450 and £600 p.a.

Full particulars and form of application may be obtained from the undersigned, with whom applications on the prescribed form must be lodged prior to NOON of Friday, 19th May.

R practitioners must have obtained the sanction of the Scottish Central Medical War Committee to their application.

JOHN ROBSON, Clerk of the Board.

County Buildings, Dumfries, 2nd May, 1944.

**THE ROYAL LIVERPOOL CHILDREN'S HOSPITAL, Myrtle-street,** LIVERPOOL, 7. Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT CASUALTY OFFICER (B2), vacant 1st June, 1944. The salary is at the rate of £250 p.a., with full residential emoluments. R and W practitioners holding A posts may also apply, when appointment will be limited to 6 months.

Applications, accompanied by copies of 3 testimonials and the name of a referee, should be sent to the Secretary of the Hospital by an early post.

**SURREY COUNTY COUNCIL. Warren Road Hospital, Guildford.** Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE OFFICER (A). Salary at the rate of £120 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months; otherwise not exceeding 1 year.

Apply to the Medical Superintendent by 24th May, 1944.

**GRIMSBY AND DISTRICT GENERAL HOSPITAL. (237 Beds.)** Applications are invited from registered medical practitioners, Male or Female, for the post of RESIDENT CASUALTY OFFICER AND HOUSE SURGEON (A), including practitioners within 3 months of qualification and liable under the National Service Acts. Appointment for 6 months. Salary at the rate of £175 p.a., with full residential emoluments.

Applications, stating age, nationality, qualifications, and copies of recent testimonials, to the Secretary-Superintendent.

**KEWSTOKE EMERGENCY HOSPITAL, Weston-super-Mare.** Applications are invited from registered medical practitioners for the post of HOUSE SURGEON (A). Commencing salary £200 p.a., with full board and residence. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications to: The Secretaries, 43, Newhall-street, Birmingham, 3.

**THE GUEST HOSPITAL, Dudley. (General Hospital, 141 Beds.)** Applications are invited for the post of HONORARY ANÆSTHETIST to the Hospital. The appointment is a temporary one and terminable within 12 months of the conclusion of present hostilities.

Applications, giving particulars of age, qualifications, and experience, accompanied by copies of testimonials, should be sent not later than Friday, 2nd June, to:

H. RAYMOND HURST, House Governor and Secretary.

8th May, 1944.

**DONCASTER ROYAL INFIRMARY. Applications are invited** from medical practitioners (Male or Female) for the appointment of HOUSE SURGEON (A). The appointment will be for 6 months. Salary £175 p.a., with full residential emoluments. This large industrial area offers excellent opportunities for gaining experience. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply.

Applications, accompanied by not more than 3 testimonials, to be sent immediately to—

R. LANCASTER, Secretary-Superintendent.

**BECKETT HOSPITAL AND DISPENSARY, Barnsley. House** SURGEON (A). Applications are invited from registered medical practitioners for this appointment. Salary is at the rate of £225 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when the appointment will be for 6 months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent immediately to—

ARTHUR L. BOURNE, Secretary-Superintendent.

1st May, 1944.

**MANCHESTER ROYAL INFIRMARY. Clinical Laboratory.** Applications are invited for the post of LABORATORY TECHNICIAN (Male) holding the Certificate in Bacteriology of the Institute of Medical Laboratory Technicians. Candidates without the Certificate but with experience in bacteriological technique may be considered. State salary required.

Applications, with testimonials, to be addressed to the Director of the Clinical Laboratory.

**CAMBORNE-REDRUTH GENERAL HOSPITAL, Redruth,** CORNWALL. Applications are invited for the post of HONORARY OPHTHALMIC SURGEON. Candidates should be suitably experienced in ophthalmology and possess the Fellowship of the Royal College of Surgeons.

Full particulars on application to the Secretary.

**OVERSEAS EMPLOYMENT. Industrial Instructor (Occupational** THERAPIST) and NURSE (preferably married couple) required by the Government of Tanganyika Territory for the Kibongoto Tuberculosis Hospital for 2 to 3 years in the first instance. Salaries: Instructor, £372–£18–£480 a year; Nurse, £240–£18–£300 a year, plus cost-of-living allowance. Free passages and quarters. Candidates should be trained occupational therapists able to improve the rehabilitation of convalescent cases by occupational therapy in carefully graded stages and to relieve the medical staff of some of the administrative duties of the hospital.

Applications in writing (no interviews), stating date of birth, full details of qualifications and experience, including present employment, Identity and National Service or other registration particulars and quoting Order No. O.8.29, should be addressed to the Ministry of Labour and National Service, Appointments Department, Sardinia-street, Kingsway, London, W.C.2.

**SUDAN MEDICAL SERVICE. There are vacancies for British-born** medical Men. Candidates should be under 30 years of age and unmarried. Salary commences at £E.720 (approximately £738) a year. Some postgraduate experience is essential and preference would be given to holders of B appointments. Many members of the Service have done duty with the British Army and Sudan Defence Force and there is a growing strain on those who have been working more than 4 years without home leave. The maintenance of the efficiency of the African Medical Services has been generally recognised as a vital contribution to the United Nations War Effort and the Central Medical War Committee raises no objection to those selected taking up appointments in the Sudan.

Full particulars may be obtained from Dr. H. C. SQUIRES, Consulting Physician to the Sudan Government, 93, Harley-street, W.1 (Telephone: WEL 3423), who would be glad to see intending applicants at the earliest possible date.

**Applications are invited for the post of Assistant in Biochemistry** (Male) at the COURTAULD INSTITUTE OF BIOCHEMISTRY, MIDDLESEX HOSPITAL, W.1. Salary up to £450 p.a. will be offered to suitable applicant. Duties will include practical and theoretical teaching of 2nd M.B. students in biochemistry, and routine clinical biochemistry. A medical qualification is not essential. Applications to the Medical School Secretary, Middlesex Hospital, London, W.1.

**Assistant wanted for mixed Town and Country Practice in Hertfordshire.**—Full details on application to: Address, No. 438, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Manchester Doctor seeks fortnight's Locum, country or seaside, in** July; with hospitality for family. No payment required.—Address, No. 440, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Partnership Share for Sale, Yorkshire, ultimate succession.**—Address, No. 432, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Part-time Assistantship required indoor in London, with West** End possibilities. Holder of M.D., D.G.O., D.P.H. (Prague), and 17 years' experience. Arrangements by interview.—Address, No. 437, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Qualified Nurse, 22, Scottish, exempt, would welcome suitable** industrial or reception work in London.—Address, No. 439, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Practice for disposal, N. Wales; small panel and private.—Further** particulars: R. SUMNER & CO. LTD., 40, Hanover-street, Liverpool, 1.

**Dental Surgeon requires experienced nurse-receptionist, or young** girl for training as such.—Apply Box "S," Smith's, 82, Walmlane, London, N.W.2.

**Medical Typist undertakes Theses, Books, Applications for** Hospital Posts, Tables, &c.: 2s. 6d. per 1000 words; carbons 6d. per 1000.—Jepson, 74a, Alexandra-road, Hampstead, N.W.8.

**Psychological supervision during convalescence. A maximum of** 6 patients can be accommodated in physician's home with 10 acres of ground extending to Thames bank. 10 guineas weekly. Apply Secretary, Weir Cottage, Chertsey. Tel. 2135.

**Microscopes wanted for essential work and war factories; high** prices offered. Also Leicas and similar Cameras and "Talkies." Prompt cash.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

**Physiotherapist, for reasons of health, wishes dispose of lease of** beautiful house and garden, splendid position, S.E. town, together with full modern electrical equipment and furniture of 2 treatment rooms, including short-wave unit and cubicle, ward model X-ray unit and darkroom equipment, as it stands. Goodwill of established, lucrative practice will be handed over. Suit doctor or specialising physical medicine, registered physiotherapist, or 2 masseuses sharing. Lease, treatment room furniture and equipment, &c., £1500.—Particulars in strictest confidence from "P. T.," c/o DIXONS, 43, Great Marlborough-street, London, W.1.

**Bloomsbury. Compact Suite. Ground Floor. Suit Doctor.** Rent £135 p.a. inclusive.—NEALE, 20, Bloomsbury-square, W.C.1. MUSeum 2384/5.

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*In the Treatment of Amylaceous Dyspepsia*

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**TAKAZYMA** .. .. .. **An antacid and digestive powder**

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